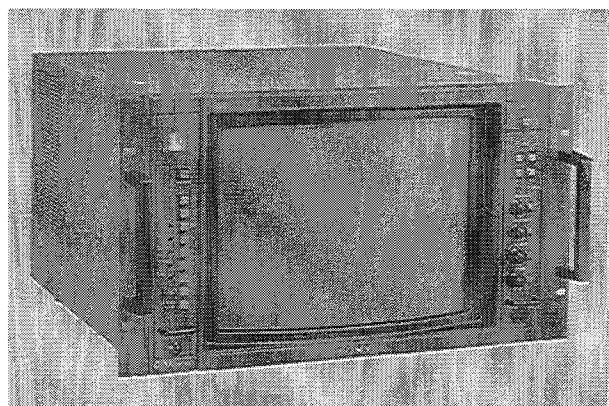


**SONY**

TRINITRON® COLOR VIDEO MONITOR

# **BVM-1316**

# **BVM-1416P**



*BVM-1316*

*Chassis No. SCC-03B-A*

*BVM-1416P*

*Chassis No. SCC-05B-A*



## **OPERATION AND MAINTENANCE MANUAL**

**1st Edition**

**Serial No. 2000001 and Higher (BVM-1316)**

**Serial No. 2000001 and Higher (BVM-1416P)**

## **WARNING**

### **For the customers in the USA**


This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

### **For the customers in Canada**

This apparatus complies with the Class A limits for radio noise emissions set out in Radio Interference Regulations.

### **SAFETY-RELATED COMPONENT WARNING!!**

**COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY. CIRCUIT ADJUSTMENTS THAT ARE CRITICAL TO SAFE OPERATION ARE IDENTIFIED IN THIS MANUAL. FOLLOW THESE PROCEDURES WHENEVER CRITICAL COMPONENTS ARE REPLACED OR IMPROPER OPERATION IS SUSPECTED.**


#### **VORSICHT!!**

Hinweis für den Benutzer  
Das Gerät ist nicht für den Einsatz in Bildschirmarbeitsplätzen vorgesehen.

#### **CAUTION!!**

**DO NOT USE THE EXTERNAL DEGAUSSER TO DEMAGNETIZE THE SCREEN.  
BE SURE TO USE THE DEGAUSS SWITCH ON THE FRONT PANEL.**

### **ATTENTION AU COMPOSANT AYANT RAPPORT A LA SÉCURITÉ!!**

**LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE  SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY. LES RÉGLAGES DU CIRCUIT QUI SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT SONT IDENTIFIÉS DANS CE MANUEL. SUIVRE LES PROCÉDURES QUAND LES COMPOSANTS CRITIQUES SONT REMPLACÉS OU LE FONCTIONNEMENT IMPROPRE EST SUSPECTÉ.**

#### **ATTENTION!!**

**NE PAS UTILISER DE DÉMAGNÉTISEUR EXTERIEUR POUR DÉMAGNÉTISER L'ÉCRAN.  
UTILISER LA TOUCH DE DÉMAGNÉTISATION (DEGAUSS) SUR LA PANNEAU FRONTAL.**



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# Section 1 Operation

## 1-1. Overview

### 1-1-1. Features

The BVM-1316 and BVM-1416P are high-performance color video monitors designed for critical evaluation of video signals in broadcasting stations and production houses.

The BVM-1316 is the NTSC model intended for use in NTSC color standard areas and the BVM-1416P is the PAL model for the PAL color standard areas. By using optional plug-in type decoder boards, both models permit any of the NTSC, PAL, SECAM, D1 and D2 video signals to be monitored.

The other features and operations are the same.

#### **High-resolution picture**

The Super Fine Pitch Trinitron picture tube (0.25-mm aperture grille pitch) gives a high-resolution, high-contrast picture. Horizontal resolution is more than 600 TV lines at the center of the picture.

#### **Stabilized color temperature**

The incorporated beam control circuit maintains the color temperature constant for a long period of time.

#### **Picture aspect selection**

In addition to the conventional 4:3 aspect, the 16:9 aspect can be selected for monitoring the increasing number of wide-screen programs.

#### **Split screen for precise picture confirmation**

The lower half of the picture can be displayed in monochrome mode while the upper half is displayed in color mode. This facilitates confirmation of the luminance and chrominance channels, evaluation of the noise in the chrominance or luminance channel, etc.

#### **Blue-only mode for precise evaluation of noise components**

In blue-only mode, an apparent monochrome display is obtained with all three control grids driven with a blue signal. This facilitates color saturation and phase adjustments and observation of VTR noise.

#### **Easy-to-use menu operations**

The essential parameters to be preset for video monitoring can be easily set by selecting menu options displayed on the screen.

## Section 1 Operation

### Other features

- Picture setup function facilitating adjustment of the monitor's reference black for the black level of an incoming video signal
- Pulse cross function for simultaneous checking of the horizontal and vertical sync signals or VITS (Vertical Interval Test Signal)
- Built-in crosshatch and 100% white signal generators, facilitating monitor setup
- VITC (Vertical Interval Time Code) display possible using the optional BKM-1460 VITC adaptor
- Auto chroma/phase adjustment, automatic white balance adjustment etc. are possible using the optional BKM-2056 auto set-up adaptor.
- Precise setting of black level of the monitor, using the optional BKM-1480 black level signal generator
- Drawers containing white balance and menu controls and other function selectors
- High-performance comb filters available for the BVM-1316 as built-in standard. (For the BVM-1416P, the BKM-1422 is available as an option.)
- Auto and manual degaussing
- Three-position AFC switch
- Overdrive protection circuit to protect against picture tube damage
- EIA standard 19-inch rack mounting, using the optional BKM-1400 rack mount kit

### 1-1-2. Options

The following optional accessories are available for flexible changes and enhancement of the functions of the BVM-1316/1416P.

#### Caution

When installing the optional boards, be sure to perform the necessary settings by following the procedure mentioned in "To specify the installed optional boards" of "1-4-7. Defining the Monitor Configuration." If the settings are not correctly performed, the optional boards may not function properly.

#### **BKM-1400 rack mount kit**

For mounting in an EIA standard 19-inch rack

#### **BKM-1410 NTSC adaptor (BC board)** [built-in standard for the BVM-1316]

Decoder board for the NTSC color system

#### **BKM-1411 NTSC comb adaptor (BB board)**

Comb filter board for the NTSC color system

**BKM-1412 NTSC comb adaptor (BT board)** [built-in standard for the BVM-1316]

Dynamic comb filter board for the NTSC color system

**BKM-1420 PAL adaptor (BD board)** [built-in standard for the BVM-1416P]

Decoder board for the PAL color system

**BKM-1421 PAL-M adaptor (BM board)**

Decoder board for the PAL-M color system

**BKM-1422 PAL comb adaptor (BT board)**

Comb filter board for the PAL color system

**BKM-1430 SECAM adaptor (BE board)**

Decoder board for the SECAM color system

**BKM-1440 RGB/component adaptor (BF board)**

Decoder outputs of RGB or component signals

**BKM-1460 VITC adaptor (BL board)**

Reader of Vertical Interval Time Code

**BKM-1470 safe area display (BQ board)**

For displaying the safe area

**BKM-1480 black level signal generator (BS board)**

For generating black level signals

**BKM-2053 auto set-up probe**

For auto set-up operation with the BKM-2056 auto set-up adaptor

**BKM-2056 auto set-up adaptor (BN, BO and BP boards)**

For auto chroma/phase adjustment, auto white balance adjustment, and selection of color temperature

**BKM-2085-14 digital 4:2:2 serial input kit (BA3 and BV boards)**

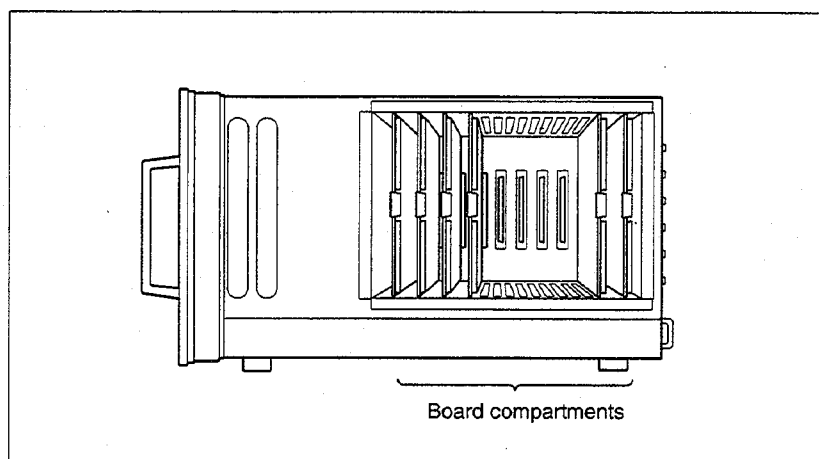
For two serial inputs of component digital video signals

**BKM-2090-14 D-2 serial input kit (BA3 and BU boards)**

For serial input of a digital composite video signal

### Combination of the optional boards

The BVM-1316/1416P is equipped with the board compartments B1 through B5 behind the right-side panel, each of which can hold an optional board selected from the B boards listed above.



Right-side view

The BVM-1316 comes from the factory with the BT (NTSC comb adaptor) and BC (NTSC adaptor) boards installed in compartments B4 and B5.

The BVM-1416P comes from the factory with the BD (PAL adaptor) boards installed in compartment B5.

Note that the combinations of boards are limited by the allowable board assignments, as shown in the table on the next page.

Add the desired boards or replace the supplied BT, BC or BD board with optional boards, referring to the table on the next page.

#### Notes

- The compartments other than B1 through B5 are reserved for the supplied BA, BG, BH, BI and BJ boards. Be sure to use these boards in the respective compartments having the same names.
- Do not leave compartment B5 empty. Be sure to insert one of the boards specified in the table on the next page. If no board is inserted, the luminance/chrominance or luminance channel will not be activated in composite signal mode.

Board assignment

Board name	Function	Compartment name				
		B5	B4	B3	B2	B1
BB (BKM-1411)	NTSC comb filter	X	○	○	○	○
BT (BKM-1412)	NTSC comb filter	○	○	○	○	○
BT (BKM-1422)	PAL comb filter	○	○	○	○	○
BC (BKM-1410)	NTSC decoder	○	○	○	○	○
BD (BKM-1420)	PAL decoder	○	○	○	○	○
BE (BKM-1430)	SECAM decoder	○	○	○	○	○
BM (BKM-1421)	PAL-M decoder	○	○	○	○	○
BF (BKM-1440)	RGB/component adaptor	X	X	○	X	X
BL (BKM-1460)	VITC reader	X	X	X	○	X
BQ (BKM-1470)	Safe area display	X	△	X	○	X
BS (BKM-1480)	Black level signal generator	○	○	○	○	○
BN, BO, BP (BKM-2056)	Auto set-up adaptor	○	○	X	X	X
BV, BA3 (BKM-2085-14)	Digital 4:2:2 serial interface	X	X	X	X	○
BU, BA3 (BKM-2090-14)	D-2 serial interface	X	X	X	X	○

○ : acceptable

× : not acceptable

△ : acceptable but the switch or control settings on the subcontrol panels cannot control the display.

**Notes**

- Do not use the BD (PAL decoder) and the BM (PAL-M decoder) boards simultaneously. This causes malfunctions of the monitor.
- Do not use the BB (NTSC comb filter) and the BT (NTSC comb filter) boards simultaneously. This causes malfunctions of the monitor.

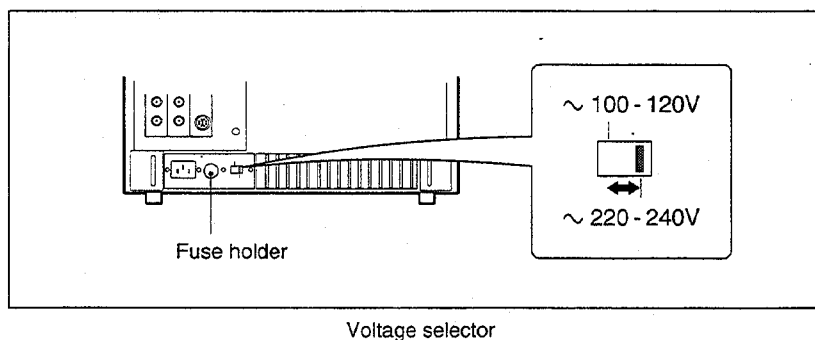
*For details on installation and functions of the optional boards, refer to the operation and maintenance manuals of the boards.*

## Section 1 Operation

### 1-2. Voltage Selection

The BVM-1316 operates on 100-120 V AC and the BVM-1416P operates on 220-240 V AC.

Before connecting the unit to an AC outlet, make sure the voltage selector at the rear of your monitor is set for the appropriate voltage. If not, change the position of the selector.



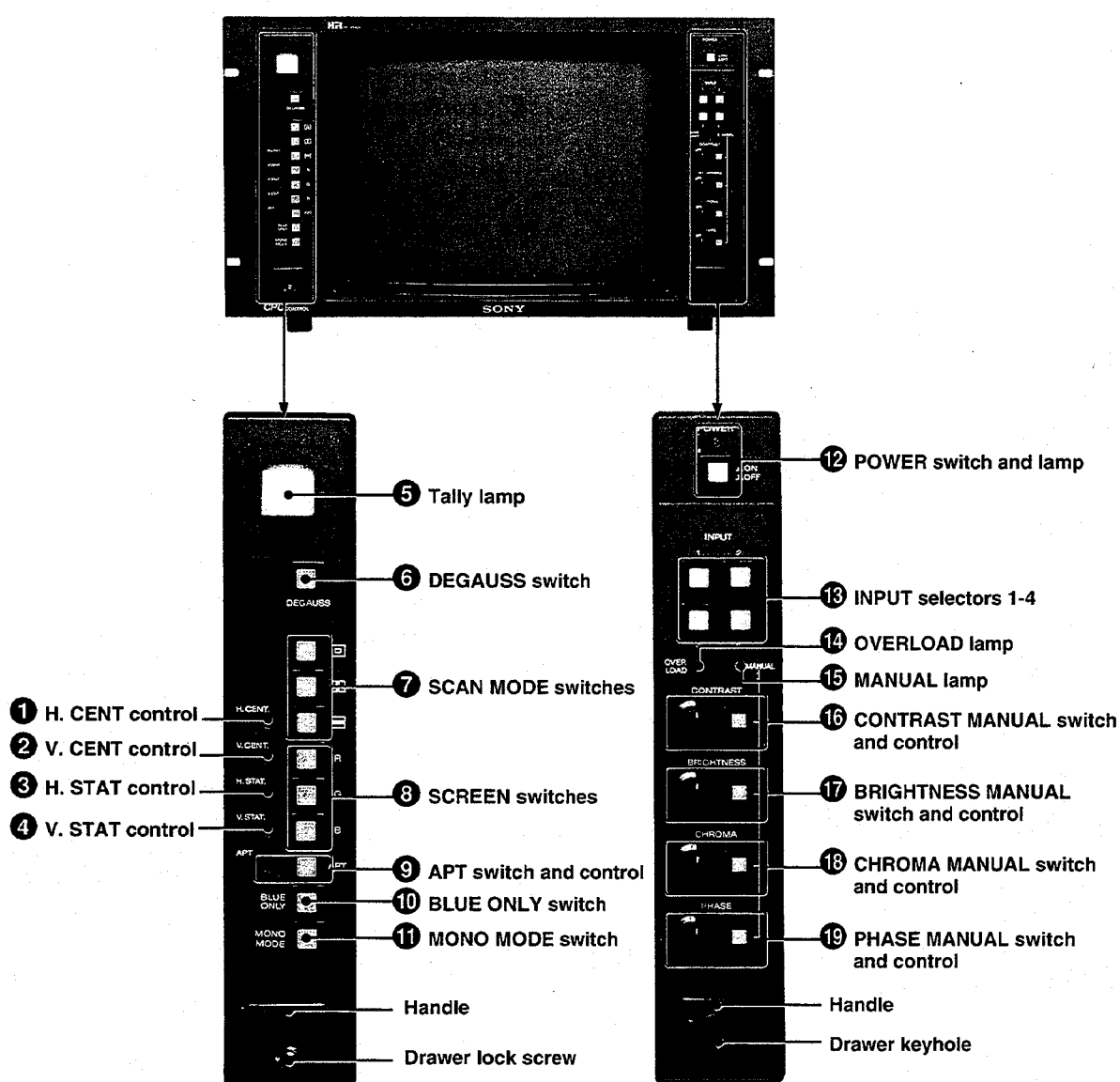
#### Note

Use a 4A/125 V fuse for the BVM-1316 (100-120 VAC) and a T2A/250V fuse for the BVM-1416P (220-240 V AC). The appropriate fuse is installed at the factory in accordance with the voltage presetting.



## 1-3. Location and Function of Parts

### 1-3-1. Front Panel



The photo shows the BVM-1316. The parts configuration is common to the BVM-1416P.

Front panel

## Section 1 Operation

### ① H. CENT (horizontal centering) control

Adjust the horizontal position of the picture.

### ② V. CENT (vertical centering) control

Adjust the vertical position of the picture.

### ③ H. STAT (horizontal static) control

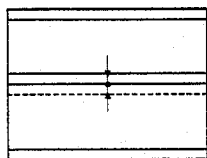
Adjust the convergence of red and green in the horizontal direction at the screen center. Adjust the convergence of corresponding portion of the screen as follows.



When adjusting the convergence, observe the portion of the screen indicated by the arrows in the above figure. The red and blue beams move symmetrically to the green beam.

### ④ V. STAT (vertical static) control

Adjust the convergence of red and green in the vertical direction at the screen center. Adjust the convergence of corresponding portion of the screen as follows.



When adjusting the convergence, observe the portion of the screen indicated by the arrow mark in the above figure. The red and blue beams move symmetrically to the green beam.

### ⑤ Tally lamp

Lights when pin No. 3 and No. 8 of the REMOTE connector on the rear panel are short-circuited. Insert one of the supplied tally number plates (1 to 5) when the left drawer is open.

### ⑥ DEGAUSS switch

When the power is turned on, automatic degaussing is activated.

To demagnetize the screen manually, press this switch momentarily with the power on.

When degaussing repeatedly, wait for 5 minutes or more before pressing the switch again.

### ⑦ SCAN MODE switches

☐ (underscan): Depress this switch for underscanning. The display size is reduced by approximately 3% so that four corners of the raster are visible.

☐ (horizontal delay): Depress this switch to observe the horizontal sync signal in the left quarter of the screen. Picture brightness is automatically increased for easy observation.

☐ (vertical delay): Depress this switch to observe the vertical sync signal. The picture is shifted vertically and the vertical sync signal is displayed near the center of the screen. Picture brightness is automatically increased for easy observation.

- A pulse cross is displayed by depressing both the ☐ and ☐ switches.

- To resume normal scanning, press to release the depressed switches.

### ⑧ SCREEN switches

The R, G and B switches turn the red, green and blue beams respectively on and off. To turn off the beam, depress the switch. To turn it on again, press to release it.

### ⑨ APT (aperture) switch and control

Normally keep this switch released. A flat frequency response is obtained.

For aperture correction, depress the switch and turn the control. The boost frequency, 4.5 MHz or 6.5 MHz, can be selected with the S1 switch on the internal BG board.

With the S1 switch set at the 4.5 MHz position, the frequency response can be adjusted continuously with up to 6 dB boost at 4.5 MHz for subjective enhancement of the displayed picture.

With the S1 switch set to the 6.5 MHz position, the frequency response can be adjusted continuously with up to 6 dB boost at 6.5 MHz for compensation of aperture loss of the CRT.

**10 BLUE ONLY switch**

Normally keep this switch released. Depress this switch to turn off the red and green signals. A blue signal is displayed as an apparent monochrome picture on the screen. This facilitates CHROMA and PHASE control adjustments and observation of VTR noise.

**11 MONO MODE switch**

Normally keep this switch released (AUTO mode). Color or monochrome mode is automatically selected according to the presence or absence of color burst.

Depress the switch to display color pictures in monochrome (MONO mode).

**12 POWER switch and lamp**

Depress this switch to turn on the power. The lamp lights. To turn it off, press the switch again.

**13 INPUT selectors 1 - 4**

Select the input signal to be monitored by pressing one of these buttons.

The requirements of the input signals can be set with the CONFIGURATION buttons in the right drawer and can be assigned independently to the selectors and stored in memory through the INPUT CONFIG menu operation.

See "1-4-2. Setting the Input Configuration."

**14 OVERLOAD lamp**

Lights to warn of overloading of the CRT.

**15 MANUAL lamp**

Lights when any of the four MANUAL switches 16 through 19 is depressed.

**16 CONTRAST MANUAL switch and control**

When this switch is in the released position, the contrast preset with the PRESETS menu operation is obtained.

To adjust the contrast manually, depress the switch and turn the control.

See "1-4-3. Presetting the Picture Levels."

**17 BRIGHTNESS MANUAL switch and control**

When this switch is in the released position, the brightness preset with the PRESETS menu operation is obtained.

To adjust the brightness manually, depress the switch and turn the control.

See "1-4-3. Presetting the Picture Levels."

**18 CHROMA MANUAL switch and control**

When this switch is in the released position, the color saturation preset with the PRESETS menu operation is obtained.

To adjust the color saturation manually, depress the switch and turn the control.

See "1-4-3. Presetting the Picture Levels."

**19 PHASE MANUAL switch and control**

When this switch is in the released position, the subcarrier phase preset with the PRESETS menu operation is obtained.

To adjust the subcarrier phase manually, depress the switch and turn the control.

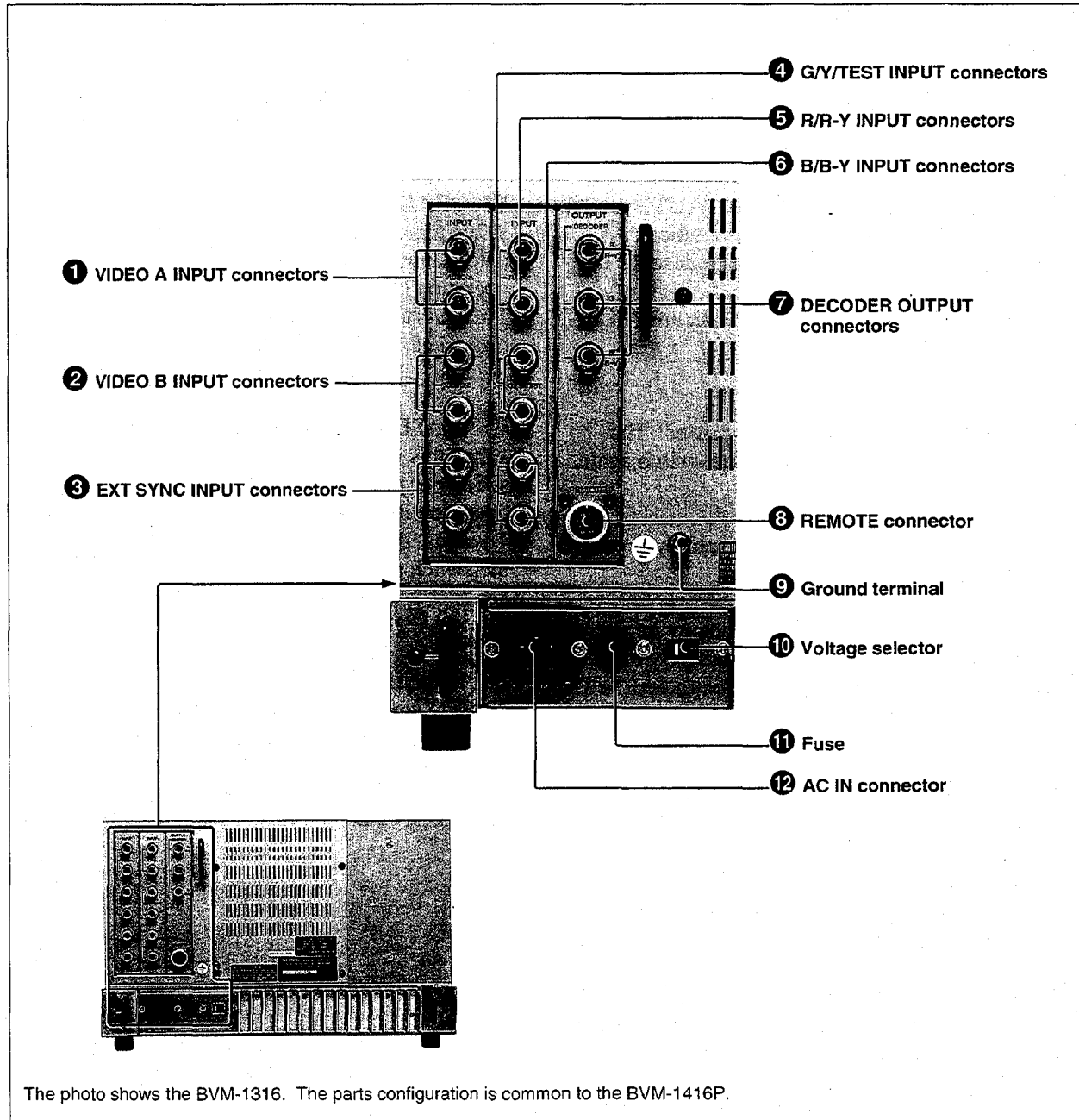
See "1-4-3. Presetting the Picture Levels."

**Note**

The PHASE MANUAL switch and control are disabled when the SECAM system is selected (the SECAM lamp is lit) with the SYSTEM button in the right drawer, or the PAL system is selected (PAL lamp is lit) with selecting PAL D mode (the PAL S/SECAM F/COMB S lamp is not lit).

## Section 1 Operation

### 1-3-2. Rear Panel



Rear panel

#### ① VIDEO A INPUT connectors (BNC)

#### ② VIDEO B INPUT connectors (BNC)

Input composite video signals.

Use one connector of each pair for input and the other for loop-through output.

When the loop-through output is not used, attach a 75-ohm terminator.

#### ③ EXT SYNC INPUT (external sync input) connectors (BNC)

Input a sync signal.

Use one connector for input and the other for loop-through output.

When the loop-through output is not used, attach a 75-ohm terminator.

**④ G/Y/TEST INPUT connectors (BNC)****⑤ R/R-Y INPUT connectors (BNC)****⑥ B/B-Y INPUT connectors (BNC)**

Input RGB video signals, component signals or a composite test signal. The signal format can be selected with the FORMAT button in the right drawer.

Use one connector of each pair for input and the other for loop-through output.

When the loop-through output is not used, attach a 75-ohm terminator.

**⑦ DECODER OUTPUT connectors (BNC)**

Output RGB or component (Y, R-Y, B-Y) outputs decoded from the composite (VIDEO A, VIDEO B or TEST) or component signals being displayed on the screen with the BKM-1440 RGB/component adaptor installed.

The RGB or component outputs are selected with the S1 selector on the BF board of the BKM-1440 kit.

To provide RGB output, set the S1 selector to the upper position.

To provide component output, set it to the lower position.

**Notes**

- The DECODER OUTPUT connectors do not provide the correct RGB outputs when RGB signals are displayed on the screen. To obtain the correct RGB outputs, use the loop-through outputs of the R, G and B INPUT connectors.
- The outputs obtained from noncomposite signals are also noncomposite. Supply a sync signal from the EXT SYNC INPUT connector when required.
- The output signals are affected by the CHROMA, PHASE and APERTURE controls and MATRIX button.
- The color killer circuit is not activated for output signals.

**⑧ REMOTE connector**

Connect to an external control device using the supplied 10-pin connector.

To enter remote control mode, press the LOCAL/REMOTE button in the right drawer so that the associated lamp lights.

The input mode and the pin assignment can be set through the REMOTE menu operation.

See "1-4-6. Assigning the Remote Control Functions."

**⑨ Ground terminal**

Connect to the system ground, when required.

**⑩ Voltage selector**

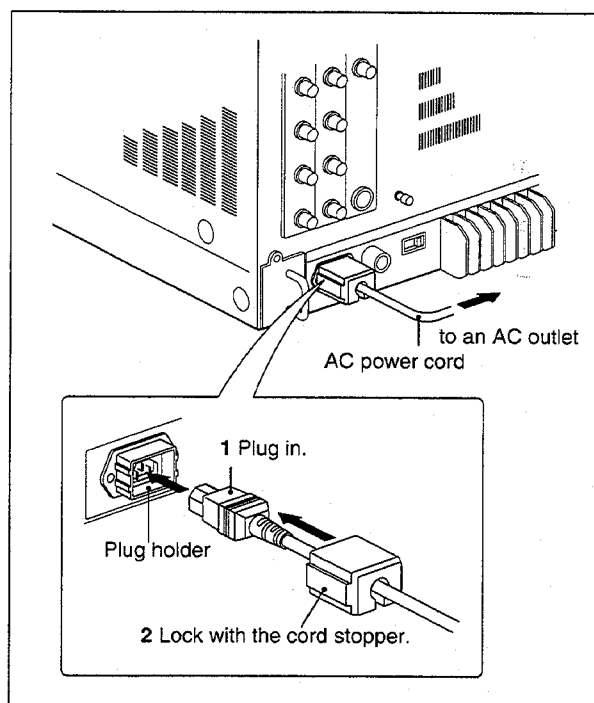
Set to 100-120 V AC for the BVM-1316 or 220-240 V AC for the BVM-1416P.

**⑪ Fuse**

Use a 4A fuse for the BVM-1316 or a T2A fuse for the BVM-1416P.

**⑫ AC IN connector**

Connect the supplied AC power cord here and secure it with the supplied cord stopper.

**NOTICE**

THIS NOTICE IS APPLICABLE FOR THE USA ONLY.

If shipped to the USA, use the UL LISTED power cord specified below for 220 - 240 V AC operation.

**DO NOT USE ANY OTHER POWER CORD.**

Plug cap	Tandem blade with ground pin
Cord	Type SJT, three 16 or 18 AWG Wires

Length	Maximum 15 feet
--------	-----------------

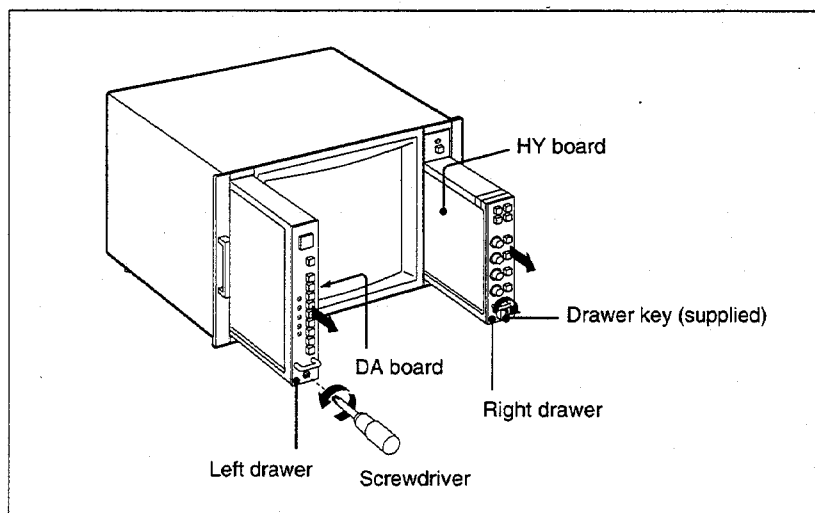
Rating	Minimum 10 A, 250 V AC
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## Section 1 Operation

### 1-3-3. Subcontrol Panels inside the Drawers

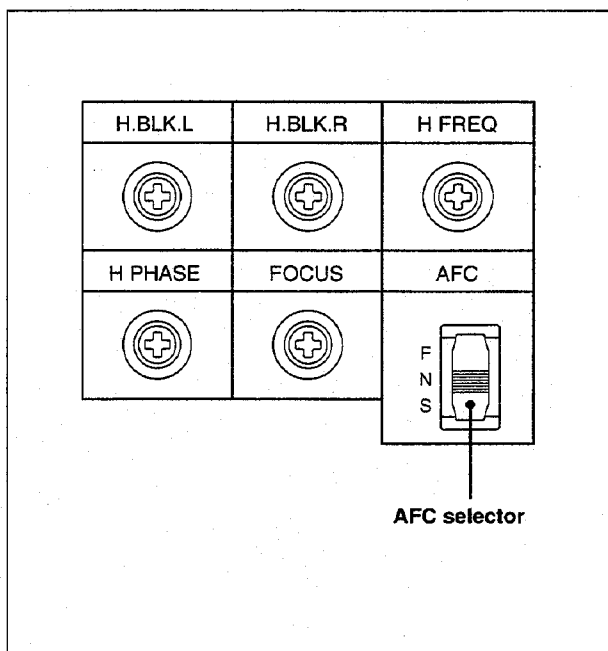
To open the right drawer, insert the supplied drawer key into the keyhole of the drawer lock, turn it 90° clockwise and pull the drawer out.

To open the left drawer, unlock the lock screw using a screwdriver. Adjust the button and controls on the subcontrol panels when the monitor is fully warmed up. Warm-up time will be at least 30 minutes after the power has been turned on.



Subcontrol panels

#### DA board



DA board

#### AFC (automatic frequency control) selector

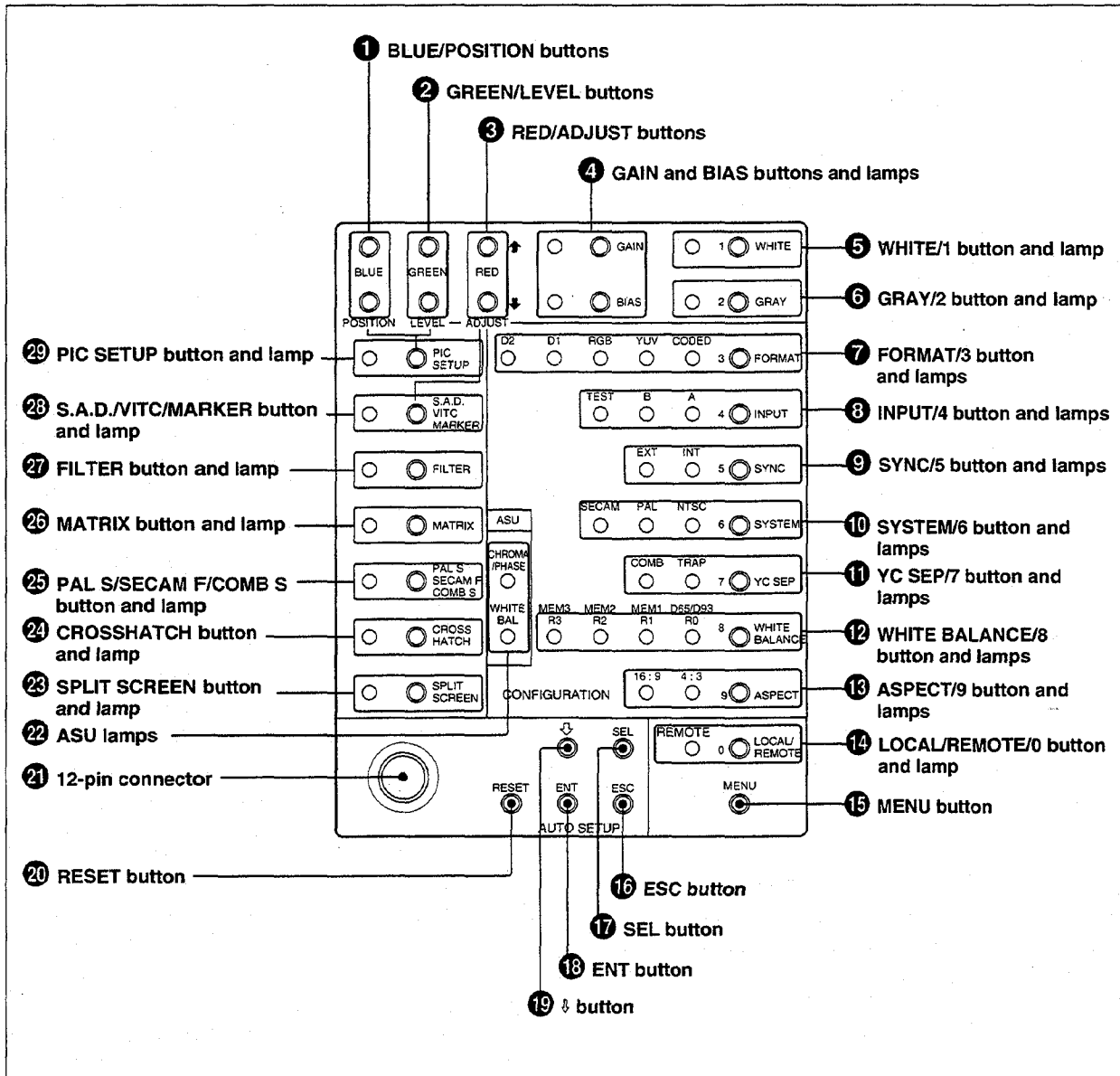
Select the AFC time constant.

**F (fast):** This mode is fast enough to compensate for VTR jitter. Set to this position to obtain a stable playback picture from a VTR.

**N (normal):** Normally set to this position.

**S (slow):** This mode is slow enough to display the time base instability introduced by mechanical jitter in the VTR playback signal.

## HY board (input configuration, menu and auto setup operation section)



HY board

**1 BLUE/POSITION buttons**

When adjusting white balance (the GAIN or BIAS lamp is lit), use these buttons to adjust the blue signal.

When adjusting the black level (the PIC SETUP lamp is lit), use them to adjust the position of the input signal checking zone.

**2 GREEN/LEVEL buttons**

When adjusting white balance (the GAIN or BIAS lamp is lit), use these buttons to adjust the green signal.

When adjusting the black level (the PIC SETUP lamp is lit), use them to adjust the brightness of the black reference area.

## Section 1 Operation

### ③ RED/ADJUST buttons

When adjusting white balance (the GAIN or BIAS lamp is lit), use these button to adjust the red signal.

When the safe area is displayed (the S.A.D./VITC/MARKER lamp is lit), use them to adjust the safe area size.

### ④ GAIN and BIAS buttons and lamps

When adjusting the white balance, select the adjustment items.

**BIAS:** Adjust the white balance at the lowlight and brightness of the screen.

**GAIN:** Adjust the white balance at the highlight and contrast of the screen.

For the adjustments, use the BLUE/POSITION, GREEN/LEVEL and RED/ADJUST buttons.

### ⑤ WHITE/1 button<sup>1)</sup> and lamp

When adjusting the white balance at the highlight, press this button so that the lamp lights. The internal 100% white signal is displayed on the screen. To turn off the signal, press the button again.

### ⑥ GRAY/2 button<sup>1)</sup> and lamp

When adjusting the white balance at the lowlight, press this button so that the lamp lights. The internal gray signal is displayed on the screen. To turn off the signal, press the button again.

### ⑦ FORMAT/3 button<sup>1)</sup> and lamps

Select the signal format according to the signal to be monitored. Press this button so that the lamp of the appropriate format lights.

**CODED:** For monitoring NTSC, PAL or SECAM signal with the decoder board (BC, BD, BE or BM) installed.

**YUV:** For monitoring Y/R-Y/B-Y component signals.

**RGB:** For monitoring RGB signals.

**D-1:** For monitoring D-1 format component signals.

**D-2:** For monitoring a D-2 format composite signal.

### ⑧ INPUT/4 button<sup>1)</sup> and lamps

When monitoring a composite signal, select the input connector.

Press this button so that the lamp of the appropriate connector lights.

**A:** For monitoring the signal connected to the VIDEO A INPUT connector.

**B:** For monitoring the signal connected to the VIDEO B INPUT connector.

**TEST:** For monitoring the test signal connected to the G/Y/TEST connector.

### ⑨ SYNC/5 button<sup>1)</sup> and lamps

Select the sync mode. Press this button so that the lamp of the appropriate mode lights.

**INT (internal sync mode):** The unit operates in synchronization with the sync signal of the composite signal being displayed on the screen.

**EXT (external sync mode):** The unit operates in synchronization with the sync signal supplied from the EXT SYNC INPUT connector.

### ⑩ SYSTEM/6 button<sup>1)</sup> and lamps

When monitoring a composite signal or a signal decoded with a decoder board (BC, BD, BE or BM), select the color system according to the signal to be monitored. Press this button so that the lamp of the appropriate system lights.

**NTSC:** For monitoring a signal of the NTSC color system.

**PAL:** For monitoring a signal of the PAL color system.

**SECAM:** For monitoring a signal of the SECAM color system.

#### Note

If the decoder board for the selected color system has not been installed:

- The picture does not appear when the FILTER lamp is lit (FILTER ON).
- The picture is displayed in monochrome when the FILTER lamp is not lit (FILTER OFF).

1) These buttons also function as numeric keys when specifying the password.  
See "1-4-5. Changing and Applying the Password."



**11 YC SEP(Y/C separation filter)/7 button<sup>1)</sup> and lamps**

For NTSC or PAL signal, select the filter to be used for Y/C separation. Press the button so that the lamp of the appropriate filter lights.

**COMB:** To use the comb filter with the comb filter board (BB or BT) installed.

**TRAP:** To use the built-in trap filter.

**Note**

When the appropriate comb filter board has not been installed, the trap filter is activated regardless of the setting with this button.

**12 WHITE BALANCE/8 button<sup>1)</sup> and lamps**

Select the white balance and picture levels stored in the respective registers. Press this button so that the lamp of the appropriate register lights. At the factory, the white balance for D65 has been stored in all the registers.

**D65/D93 R0:** To use the white balance and picture levels stored in register 0.

**MEM 1 R1:** To use the white balance and picture levels stored in register 1.

**MEM 2 R2:** To use the white balance and picture levels stored in register 2.

**MEM 3 R3:** To use the white balance and picture levels stored in register 3.

*For details, see "1-4. Menu Operations."*

**13 ASPECT/9 button<sup>1)</sup> and lamps**

Select the aspect ratio of the picture to be monitored. Press this button so that the lamp of the appropriate ratio lights.

**4:3:** For the 4:3 aspect

**16:9:** For the 16:9 aspect.

**14 LOCAL/REMOTE/0 button<sup>1)</sup> and lamp**

To enable the monitor to be controlled from an external control device connected to the REMOTE connector on the rear panel, press this button so that the lamp lights (REMOTE mode). To disable the remote control (LOCAL mode), press the button again.

*For the remote control functions, see "1-4-6. Assigning the Remote Control Functions."*

**15 MENU button**

Press to initiate menu operations. The initial menu is displayed.

**16 ESC (escape) button**

Press to quit menu or auto setup operations.

**17 SEL (select) button**

Press to set the monitor to color temperature selection mode in auto setup operations. In color analyzer mode, select the memory position of the probe connected to the AUTO SETUP PROBE connector.

*For details, refer to the operation and maintenance manual of the BKM-2056 auto set-up adaptor.*

**18 ENT (enter) button**

Press to proceed to the next step during menu or auto setup operation and save the data.

**19 ↓ (cursor) button**

For selecting menu options displayed on the screen in menu or auto setup operations. Each time this button is pressed, the cursor moves downwards and, if at the bottom, jumps to the top.

**20 RESET button**

Press to reset an auto setup operation.

**21 12-pin connector**

For the optional BKM-2053 auto set-up probe.

**22 ASU (automatic setup) lamps**

**CHROMA/PHASE:** Lights when the automatic chroma and phase adjustment is completed with AUTO CHROMA/PHASE in auto setup operations. The lamp goes off when MANUAL is selected on the SELECT MONITOR MEM menu in auto setup operations.

**WHITE BAL:** Lights when one of the color temperature to be transferred to the monitor by the auto white balance adjustment is selected on the SELECT MONITOR MEM menu in auto setup operations. When this lamp is lit, the color temperature selection on the SELECT MONITOR MEM menu can be performed using the WHITE BALANCE/8 button.

1) These buttons also function as numeric keys when specifying the password.

*See "1-4-5. Changing and Applying the Password."*

## Section 1 Operation

### 23 SPLIT SCREEN button and lamp

To display the lower half of the picture in monochrome mode, press this button so that the lamp lights. Press this button again to resume the normal picture.

### 24 CROSSHATCH button and lamp

To display the internal crosshatch pattern for convergence adjustment, press this button so that the lamp lights.

The crosshatch pattern is synchronized with the selected composite sync signal.

To turn off the pattern, press the button again.

### 25 PAL S/SECAM F/COMB S button and lamp

While monitoring a PAL signal, the demodulation mode of the the PAL system can be switched. When this button is pressed and the lamp lights, S (simple) mode is selected. By pressing the button to turn off the lamp, D (deluxe) mode is selected.

While monitoring a SECAM signal, the ID signal of the the SECAM system can be switched. When this button is pressed and the lamp lights, the F (field) signal is selected. By pressing the button to turn off the lamp, the L (line) signal is selected.

When the BKM-1412 NTSC comb filter is activated, the comb filter mode can be switched. When this button is pressed and the lamp lights, the S (simple) comb filter is selected. By pressing the button to turn off the lamp, the D (dynamic) comb filter is selected. (When the BKM-1411 NTSC comb filter is activated, the S (simple) comb filter is always selected regardless of the button setting.)

### 26 MATRIX button and lamp

Should normally be OFF (lamp not lit).

By pressing this button so that the lamp lights (ON), the matrix circuit is activated and the chromaticity of the displayed picture more closely approximates to that of "true" NTSC phosphors. To turn off the matrix circuit, press the button again.

### 27 FILTER button and lamp

To activate the comb or trap filter (selected with the YC SEP button) in MONO mode (MONO MODE switch on the front panel depressed), press this button so that the lamp lights.

To deactivate the filter for a wider frequency range, press the button again.

#### Note

In AUTO mode (the MONO MODE switch released), the filter is always activated for color signals regardless of the setting with this button.

### 28 S.A.D. (safe area display)/VITC/MARKER button and lamp

When the safe area is displayed with the BQ board (BKM-1470 safe area display) installed, the adjustment of the safe area size can be enabled.

When the BL board (BKM-1460 VITC adaptor) has been installed, the VITC display can be turned on and off.

### 29 PIC SETUP (picture setup) button and lamp

Use to match the black reference of the monitor with the black level of the input signal to be monitored.

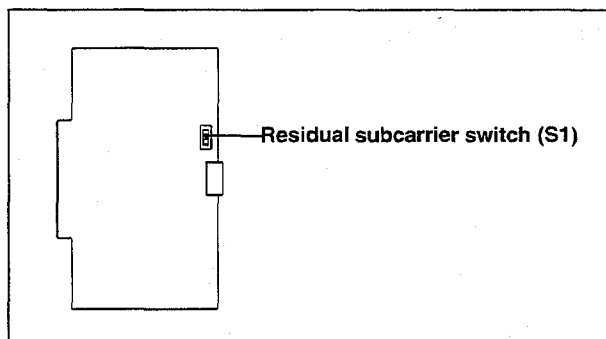
By pressing this button so that the lamp lights, a vertical picture band and the black reference of the monitor are displayed on the screen for easy level comparison.

See "1-5-2. Black Level Adjustment."

### 1-3-4. Switches inside the Cabinet

To access to the switches on the boards inside cabinet, see Section 2.

#### BJ board



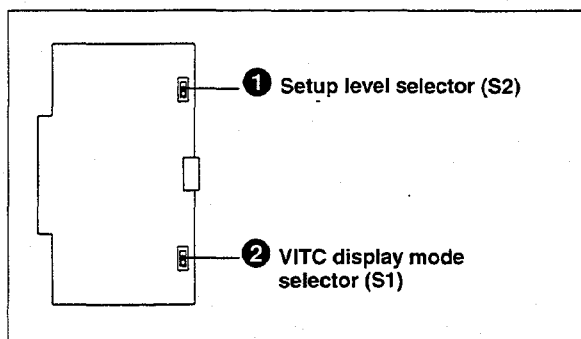
BJ board

#### Residual subcarrier switch (S1)

This switch is factory-preset to the lower position (OFF).

Normally there will be no residual subcarrier in input video signals. However, if a residual subcarrier is present, this may affect the display. Set this switch to the upper position (ON) to check if a residual subcarrier is present. If it is present in the incoming signal, color shift appears in the picture.

#### BH board



BH board

#### 1 Setup level selector (S2)

Select the setup level.

**0 IRE:** The setup level is 0%.

**AUTO:** The setup level set through the COMPONENT OFFSET or NTSC OFFSET option of the MONITOR CONFIG menu is obtained.

*See "1-4-7. Defining the Monitor Configuration."*

**7.5 IRE:** The setup level is 7.5%.

The 0% setup levels can be varied with the RV1 control and 7.5% level with the RV2 control in a range from -2.5% through +12.5%.

#### 2 VITC display mode selector (S1)

Use to invert the character and background colors for VITC display.

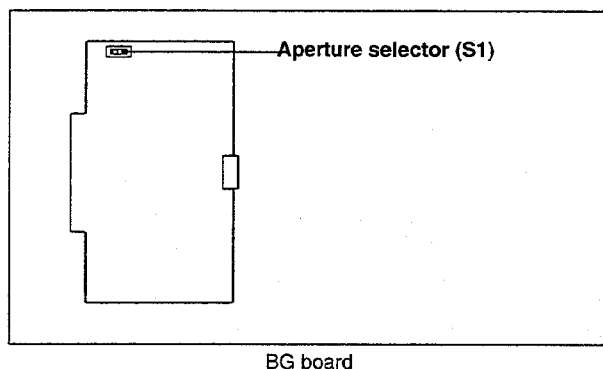
**Upper position:** Factory-preset position. The VITC is displayed in white characters on a black background.

**Lower position:** The VITC is displayed in black characters on a white background.

*For details, see the operation and maintenance manual of the BKM-1460 VITC adaptor.*

## Section 1 Operation

### BG board

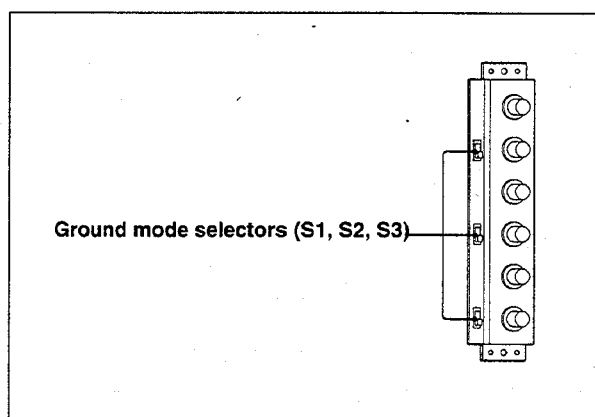


#### Aperture selector (S1)

Select the boost frequency, 4.5 MHz or 6.5 MHz, for aperture correction. This selector is factory-preset to 4.5 MHz.

### QA and QB boards

The QA board is located behind the VIDEO A, VIDEO B and EXT SYNC INPUT connector panel and the QB board is located behind the R/R-Y, G/Y/TEST and B/B-Y INPUT connector panel. To access these boards, remove the INPUT connector panels, referring to Section 2.



#### Ground mode selectors (S1, S2, S3)

The selectors on the QA board correspond to the VIDEO A, VIDEO B or EXT SYNC INPUT connectors and those on the QB board correspond to the R/R-Y, G/Y/TEST or B/B-Y connectors, respectively.

**S (nonfloating):** Factory-preset position.

Normally keep the selectors at this position.

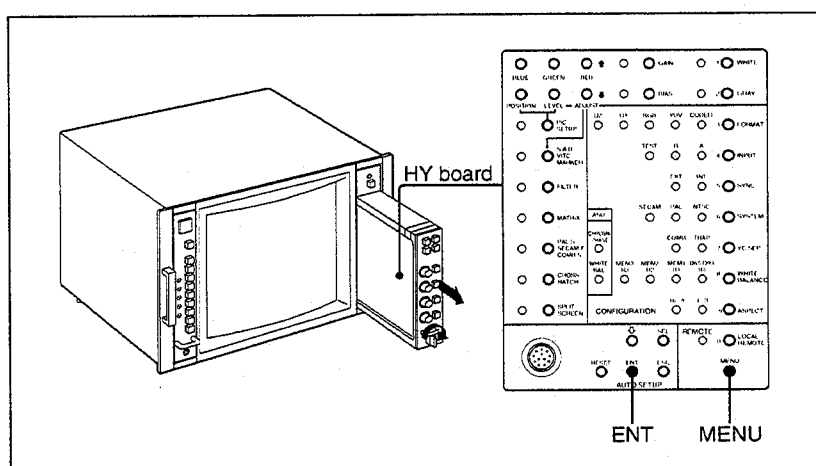
**F (floating):** When there is hum in the input signal to be monitored, set to this position. Common mode noise will be rejected.

## 1-4. Menu Operations

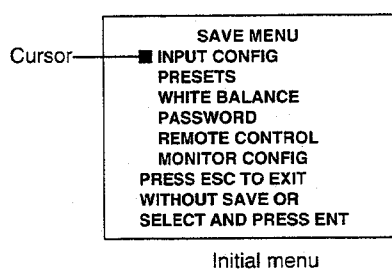
The menu operations permit the various monitor requirements to easily be set by following messages displayed on the screen.

### 1-4-1. Starting with the Menu Operations

For the menu operations, use the buttons on the HY board in the right drawer and some switches and controls on the front panel.



Pressing the MENU button displays the following initial menu showing the items which can be set through the menu operations.



**INPUT CONFIG** (input configuration): To assign input signals to INPUT selectors 1 to 4 on the front panel.

**PRESETS:** To adjust the preset values for the phase, chroma, contrast, brightness, and picture setup (black reference) levels.

**WHITE BALANCE:** To adjust the white balance.

**PASSWORD:** To specify and activate/deactivate the password.

**REMOTE CONTROL:** To assign the remote control functions.

**MONITOR CONFIG** (monitor configuration): To specify operating conditions of the monitor, such as the optional boards to be used and signal setup levels, and to restore the factory-set menu data.

## Section 1 Operation

### To select a menu option

Move the cursor with the ↓ button to the line of the desired menu option and press the ENT button.

Pressing the ↓ button moves the cursor downward and, if at the bottom, to the top.

### To cancel the menu operation on the way

Press the ESC button.

At any level of the menu operations, pressing the ESC button cancels the operations without changing any data and restores normal status.

## 1-4-2. Setting the Input Configuration

At the factory, the following input signals are assigned to INPUT selectors 1 to 4 on the front panel.

Factory-set configuration

Signal	INPUT selectors			
	1	2	3	4
FORMAT	CODED	CODED	COMPONENT	RGB
INPUT	A	B	—	—
SYNC	INT	INT	INT	INT
SYSTEM <sup>a)</sup>	NTSC/PAL	NTSC/PAL	—	—
ASPECT	4 : 3	4 : 3	4 : 3	4 : 3
YC SEP <sup>b)</sup>	COMB	COMB	—	—

a) NTSC for the BVM-1316 and PAL for the BVM-1416P.

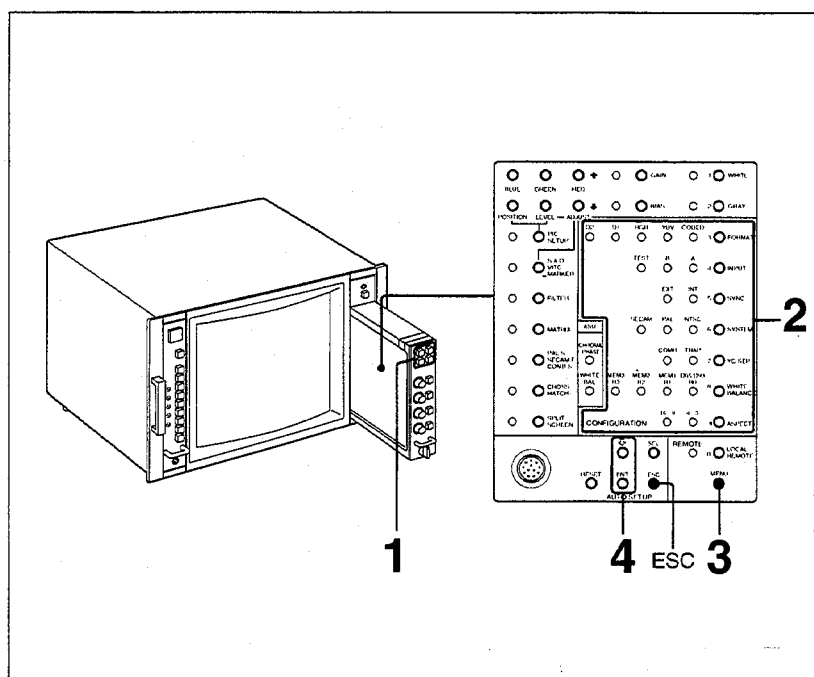
b) Only for BVM-1316. The INPUT selectors 1 and 2 on the BVM-1416P have been set to TRAP.

Using the CONFIGURATION buttons on the HY board in the right drawer, these requirements of the input signals (input configuration) can be changed as desired and stored in memory through the INPUT CONFIG menu operation.

The stored configuration is always obtained when the assigned INPUT selector is pressed.

When the change is not stored through the menu operation, the input configuration returns to the previous status when another INPUT selector is pressed.

## Operation



- 1** Press one of the INPUT selectors on the front panel.
- 2** Using the following CONFIGURATION buttons in the drawer, set the input configuration for the INPUT selector selected in step 1. Press the buttons so that the appropriate lamps light.
  - FORMAT:** Select the signal format (CODED, YUV, RGB, D-1 or D-2).
  - INPUT:** Select the input connector A, B or TEST when you select CODED for FORMAT, or A or B when you select D-1 or D-2 for FORMAT.
  - SYNC:** Select the sync mode (INT or EXT).
  - SYSTEM:** Select the color system (NTSC, PAL or SECAM) when you select CODED or D-2 for FORMAT.
  - YC SEP:** Select the filter when you select NTSC or PAL for the color system.
  - WHITE BALANCE:** Select the register (R0, R1, R2 or R3) on which the desired white balance has been stored.  
See "1-4-4. Selecting the White Balance."
  - ASPECT:** Select the picture aspect (4:3 or 16:9).
- 3** When the settings are completed, press the MENU button. The initial menu is displayed.

## Section 1 Operation

- 4 Should the cursor on the initial menu not be located at INPUT CONFIG, press the ↓ button until it returns to INPUT CONFIG, and press the ENT button.

### Note

If the message "PLEASE ENTER PASSWORD" is displayed, enter the password.

See "1-4-5. Changing and Applying the Password."

The input configuration set in step 2 for the INPUT selector selected in step 1 is now stored in memory.

The message "DATA SAVED" is momentarily displayed and the monitor returns to normal status.

Repeat this procedure for the other INPUT selectors as desired.

### To cancel the operation

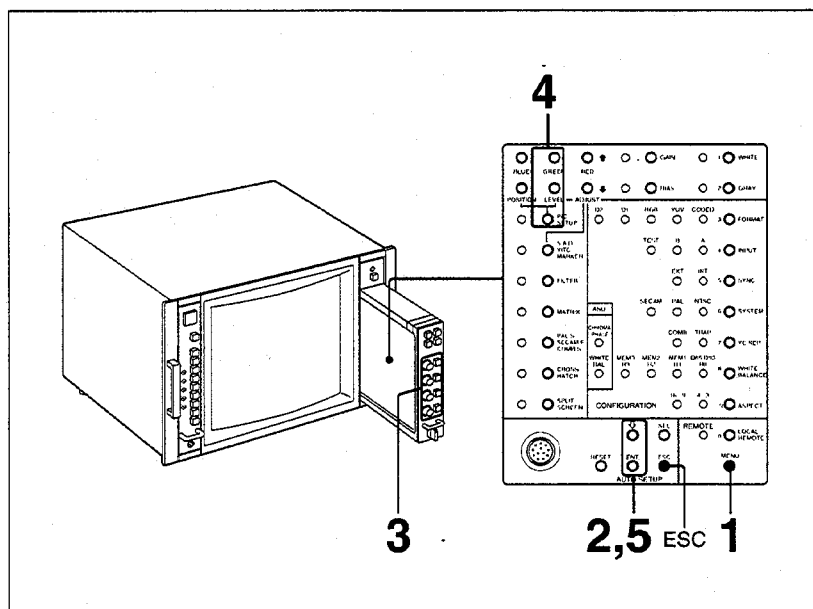
Press the ESC button before pressing the ENT button in step 4.



### 1-4-3. Presetting the Picture Levels

The four sets of the phase, chroma, brightness, contrast, and picture setup (black reference) levels can be set and stored in Registers R0 to R3 through the PRESETS menu operation.

#### Operation



- 1** Press the MENU button.  
The initial menu is displayed.
- 2** Press the ↓ button until the cursor reaches PRESETS, then press the ENT button.  
The SAVE PRESETS menu is displayed.

```

SAVE PRESETS
■ TEXT ON/OFF
DATA REGISTER R0 *
DATA REGISTER R1
DATA REGISTER R2
DATA REGISTER R3
PHASE 100 BRIGHT 100
CHROMA 100 CONTRAST 100
PICTURE SETUP LEVEL 100
SELECT AND PRESS ENT
  
```

An asterisk indicates the register which is currently selected with the WHITE BALANCE button. The levels stored in this register are displayed as numerical values on the lower half of the menu display.

#### Note

If the message "PLEASE ENTER PASSWORD" is displayed, enter the password.

See "1-4-5. Changing and Applying the Password."

## Section 1 Operation

- 3** Depress the PHASE, CHROMA, BRIGHTNESS and CONTRAST MANUAL switches and turn the respective controls so that the desired levels are obtained.
- 4** Press the PIC SETUP button so that the associated lamp lights and adjust the setup level for the picture by pressing the LEVEL buttons.

**Note**

The adjustments in steps 3 and 4 can be precisely performed while observing the numeric level indications (0 through 200, centering with 100) on the lower half of the menu display.

**To adjust while observing the picture on the screen**, set the cursor to TEXT ON/OFF and press the ENT button, and the SAVE PRESETS menu disappears.

For the picture setup level, follow the procedure in "1-5-2. Black Level Adjustment."

To return to the SAVE PRESETS menu, press the ENT button again.

- 5** Move the cursor to the register in which the set levels are to be stored and press the ENT button.

The levels set in steps 3 and 4 are now stored in the register selected in step 5.

The message "DATA SAVED" is momentarily displayed, and the monitor returns to normal status.

Repeat this procedure for the other registers as desired.

**To cancel the operation**

Press the ESC button before pressing the ENT button in step 5.

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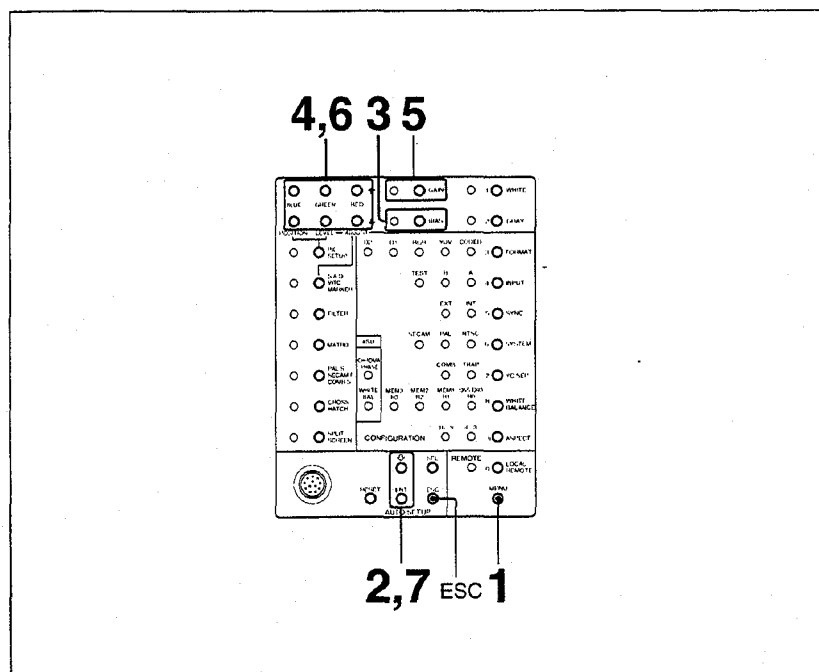
### 1-4-4. Selecting the White Balance

The four settings for white balance can be stored in Registers R0 to R3. At the factory, the setting for D65 has been stored in all the registers.

**Note**

The settings for white balance are stored in combination with the picture levels set through the PRESETS menu operation in the same Registers R0 through R3.

## Operation



- 1** Press the MENU button.  
The initial menu is displayed.
- 2** Press the ↓ button until the cursor reaches WHITE BALANCE, then press the ENT button.  
The SAVE WHITE BALANCE menu is displayed.

SAVE WHITE BALANCE			
■ TEXT ON/OFF			
DATA REGISTER R0*			
DATA REGISTER R1			
DATA REGISTER R2			
DATA REGISTER R3			
R: - GAIN	100	BIAS	100
G: - GAIN	100	BIAS	100
B: - GAIN	100	BIAS	100
SELECT AND PRESS ENT			

An asterisk indicates the register which is currently selected with the WHITE BALANCE button. The levels stored in this register are displayed as numerical values on the lower half of the menu display.

### Note

If the message "PLEASE ENTER PASSWORD" is displayed, enter the password.

See "1-4-5. Changing and Applying the Password."

## Section 1 Operation

- 3** Press the BIAS button.  
The associated lamp lights.
- 4** Adjust the R, G and B bias levels by pressing the RED, GREEN and BLUE buttons.
- 5** Press the GAIN button.  
The associated lamp lights.
- 6** Adjust the R, G and B signal gain levels by pressing the RED, GREEN and BLUE buttons.

### Note

These adjustments in steps 3 through 6 can be precisely performed while observing the numeric level indications (0 through 200, centering with 100) on the lower half of the menu display.

**To adjust while observing the picture on the screen,** set the cursor to TEXT ON/OFF and press the ENT button, and the SAVE WHITE BALANCE menu disappears.

Then, adjust the white balance by following the procedure in "1-5-1. White Balance Adjustment."

To return to the SAVE WHITE BALANCE menu, press the ENT button again.

- 7** Move the cursor to the register in which the set white balance is to be stored and press the ENT button.

The white balance set in steps 3 through 6 is now stored in the register selected in step 7.

The message "DATA SAVED" is momentarily displayed, and the monitor returns to normal status.

Repeat the above procedure for the other registers as desired.

### To cancel the operation

Press the ESC button before pressing the ENT button in step 7.

### 1-4-5. Changing and Applying the Password

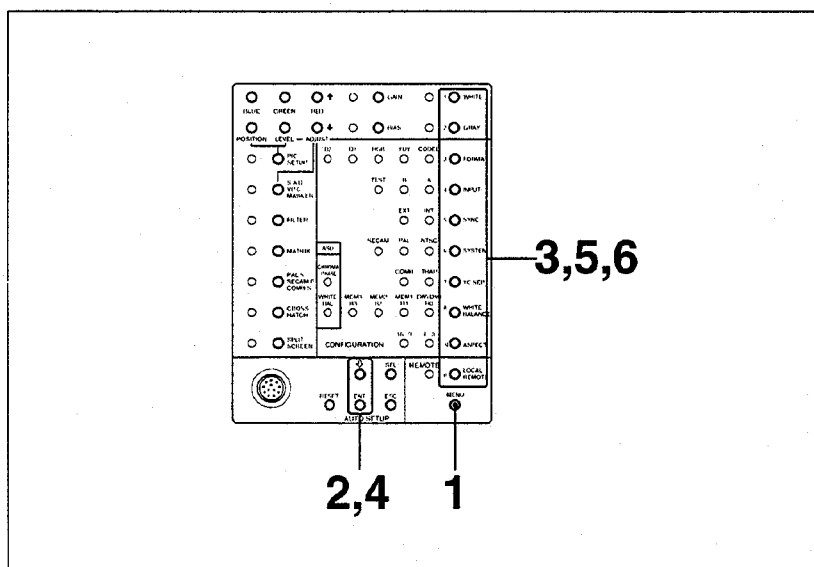
The password can be specified and applied to the desired menu option to prohibit the menu settings from being changed without permission. The password can be any desired four-digit number, which is entered by using the function buttons having additional numeric indications on the HY board.

The message **"PLEASE ENTER PASSWORD"** is displayed when you try to select the options for which the password has been applied, from the initial menu.

If an incorrect password is entered or the password is not entered within about 5 seconds after the above message is displayed, the message **"INCORRECT ENTRY"** is momentarily displayed and the menu operation is canceled.

#### To change the password

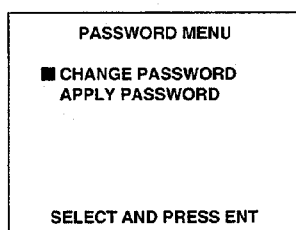
"9999" has been specified for the password at the factory. Change it to your desired four-digit number as follows.



- 1 Press the MENU button.  
The initial menu is displayed.

## Section 1 Operation

- 2 Press the  $\downarrow$  button until the cursor reaches PASSWORD, then press the ENT button.  
The message "ENTER PASSWORD" is displayed.
- 3 Enter the current password (Factory-set: 9999).  
The PASSWORD MENU is displayed.



- 4 Select the CHANGE PASSWORD option.  
The message "ENTER NEW PASSWORD" is displayed.
- 5 Enter any desired four-digit number as your new password using the buttons labeled 0 to 9.  
The message "PLEASE RE-ENTER NEW PASSWORD TO CONFIRM" is displayed.
- 6 Enter the new password again.  
The message "PASSWORD CHANGED" is displayed and the new password is now valid.

### Note

If an incorrect password is entered, "INCORRECT ENTRY. PASSWORD NOT CHANGED" is displayed and the menu operation is canceled.

### To cancel the operation

Press the ESC button before re-entering the new password in step 6.

### To apply the password

The specified password can be activated/deactivated independently for each of the initial menu options and, with the BKM-2056 installed, the auto setup option.

- 1** Perform steps 1 through 3 mentioned in "To change the password."
- 2** By pressing the  $\downarrow$  button and then ENT button, select the APPLY PASSWORD option.  
The APPLY PASSWORD menu is displayed.

APPLY PASSWORD	
■ INPUT CONFIG	NO
WHITE BALANCE	NO
PRESETS	NO
AUTO SETUP	NO
REMOTE CONTROL	NO
MONITOR CONFIG	NO
SAVE AND APPLY	
SELECT AND PRESS ENT	

NO is displayed for each option for which the password is not activated.

YES is displayed for each option for which the password is activated.

- 3** By pressing the  $\downarrow$  button, move the cursor to the option for which the password application is to be changed.
- 4** Press the ENT button to change NO to YES or vice versa.  
(Pressing the button toggles the YES/NO setting.)

Repeat steps 3 and 4 for the other options as desired.

- 5** When the password application setting is completed, move the cursor to SAVE AND APPLY and press the ENT button.  
The message "PASSWORD APPLIED" is momentarily displayed, and the monitor returns to normal status.

### To cancel the operation

Press the ESC button before pressing the ENT button in step 5.

## Section 1 Operation

### 1-4-6. Assigning the Remote Control Functions

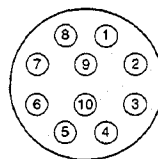
The remote control function is available either in STANDARD PARALLEL or CONFIGURE PARALLEL mode.

The mode change is achieved through the REMOTE CONTROL menu operation.

The SERIAL REMOTE option mode in the REMOTE CONTROL menu is provided for future use. If you inadvertently select it, cancel the REMOTE CONTROL menu by pressing the ESC button.

#### STANDARD PARALLEL mode

The remote control function is set to the STANDARD PARALLEL mode and the following functions are assigned to the pins of the REMOTE connector at the factory.



Pin assignment

Function			Pin No.						
INPUT	SYNC	MODE	1	2	3	4	5	6	7
A	INT	AUTO	O	O	-	O	-	-	-
		MONO	S	O	-	O	-	-	-
	EXT	AUTO	O	O	-	S	-	-	-
		MONO	S	O	-	S	-	-	-
B	INT	AUTO	O	S	-	O	-	-	-
		MONO	S	S	-	O	-	-	-
	EXT	AUTO	O	S	-	S	-	-	-
		MONO	S	S	-	S	-	-	-
VITC OFF			-	-	-	-	-	S	-
VITC HOLD			-	-	-	-	-	O	S
TALLY ON			-	-	S	-	-	-	-

S: Short-circuit with pin No.8

O: Open

-: Either S or O

The assigned function can be controlled by short-circuiting the corresponding pin with pin 8.

Note that pin 3 is fixed to TALLY and pin 8 is fixed to GND.

The remote control operations have priority over the respective buttons and switches of the monitor.



## CONFIGURE PARALLEL mode

The functions of the buttons or switches on the front panel or in the drawer listed below can be assigned to pins 1, 2 and 4 through 7, as desired.

### Front panel

INPUT selectors 2 to 4 (input selection)

MONO MODE switch (AUTO/MONO mode switching)

### HY board inside the drawer

WHITE button (ON/OFF)

SYNC button (INT/EXT sync mode switching)

YC SEP button (COMB/TRAP filter switching)

ASPECT button (16:9/4:3 picture aspect switching)

S.A.D./VITC/MARKER button (S.A.D. or VITC ON/OFF)

FILTER button (ON/OFF)

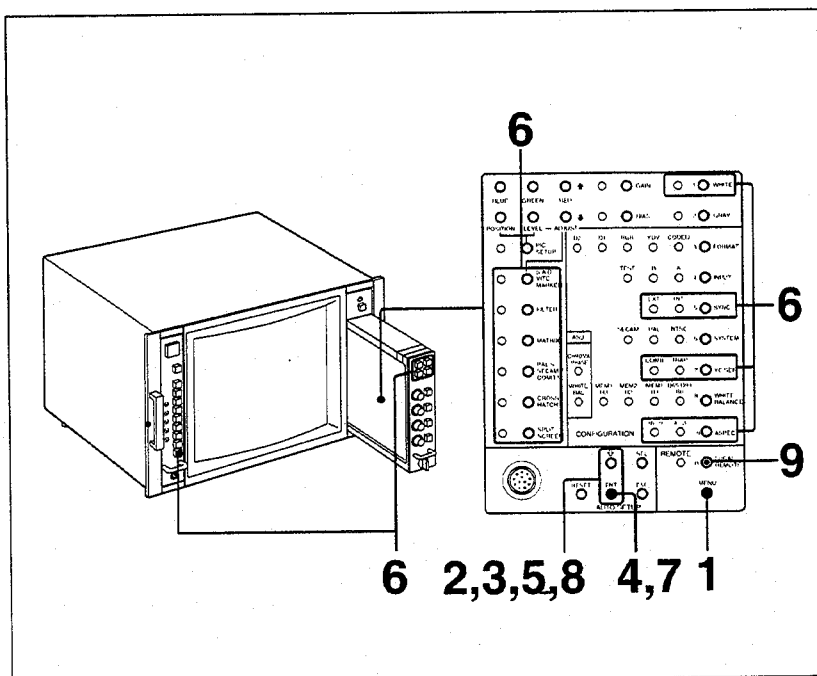
MATRIX button (ON/OFF)

PAL S/SECAM F/COMB S button (mode or type switching)

CROSSHATCH button (ON/OFF)

SPLIT SCREEN button (ON/OFF)

## Operation



- 1** Press the MENU button to display the initial menu.

## Section 1 Operation

- 2 Move the cursor to REMOTE CONTROL and press the ENT button.  
The REMOTE CONTROL MENU is displayed.

```
REMOTE CONTROL MENU
■ SERIAL REMOTE
  STANDARD PARALLEL
  CONFIGURE PARALLEL

SELECT AND PRESS ENT
```

Note that SERIAL REMOTE is for future use.

- 3 To change the pin assignment of the REMOTE connector, move the cursor to CONFIGURE PARALLEL and press the ENT button.  
To resume the factory-set pin assignment, move the cursor to STANDARD PARALLEL and press the ENT button. (For the factory-set pin assignment, see page 1-30.)  
The following display appears.

```
REMOTE CONTROL MENU

WARNING !!
HARDWARE CHANGE REQUIRED
PLEASE CONSULT MANUAL

PRESS ENT TO CONFIRM OR
ESC TO QUIT
```

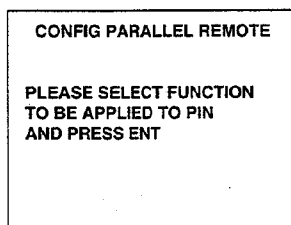
### Hardware Change

When using STANDARD PARALLEL or CONFIGURE PARALLEL mode, the 8-pin connector must be connected to HY-4 of the HY board in the drawer. Although it must have been done at the factory, make sure that the connector is connected to HY-4 properly. If not, remove the connector from HY-2 and connect it to HY-4.

- 4 Press the ENT button again to confirm the mode change in step 3. When STANDARD PARALLEL has been selected in step 3, the selected mode is now activated and the monitor returns to normal status.  
When CONFIGURE PARALLEL has been selected, the CONFIG PARALLEL REMOTE menu is displayed.

```
CONFIG PARALLEL REMOTE
■ PIN 1      MONO
  PIN 2      INPUT SEL 2/1
  PIN 4      SYNC
  PIN 5
  PIN 6      VITC
  PIN 7      MARKER MOVE
SAVE AND APPLY
PIN 3 TALLY  PIN 8 GND
SELECT AND PRESS ENT
```

- 5** Move the cursor with the  $\downarrow$  button to the pin whose assignment is to be changed, then press the ENT button.  
The following message appears.



- 6** Press the button on the front panel or in the drawer (listed on page 1-31) whose function is to be assigned to the pin selected in step 5.
- 7** Press the ENT button.

Repeat steps 5, 6 and 7 for the other pins as desired.

- 8** When the pin assignment is completed, move the cursor to SAVE AND APPLY and press the ENT button.  
The message "DATA SAVED" is momentarily displayed, and the monitor returns to normal status.
- 9** Press the LOCAL/REMOTE button to set the monitor to the remote control mode.

#### To cancel the operation

Press the ESC button before pressing the ENT button in step 8.

#### Notes

- When the INPUT selector 2, 3 or 4 is assigned to one of the REMOTE connector pins through CONFIGURE PARALLEL, the input signal for the assigned INPUT selector is selected by short-circuiting the pin to GND. In open status, the input signal of the INPUT selector 1 is selected.
- When two or more INPUT selectors are assigned to the REMOTE connector pins, be sure not to simultaneously short-circuit these pins to GND.

## Section 1 Operation

### 1-4-7. Defining the Monitor Configuration

In MONITOR CONFIG menu operation, the following operating conditions of the monitor can be defined.

**OPTION INSTALLATION:** To specify the installed optional boards.

**D1 CONFIGURATION:** To specify the system in which D-1 signals are to be received.

**COMPONENT OFFSET:** To set the setup level for component signals

**NTSC OFFSET:** To set the setup level for NTSC signals.

**MONITOR TYPE:** To define the model of your monitor.

In addition, all the menu options you changed can be reset to the factory-set conditions using the **RESTORE FACTORY SETUP** option.

#### To start with the MONITOR CONFIG menu operation

- 1** Press the MENU button to display the initial menu.
- 2** Press the ↓ button until the cursor reaches MONITOR CONFIG, then press the ENT button.  
The MONITOR CONFIGURATION menu is displayed.

MONITOR CONFIGURATION

■ OPTION INSTALLATION  
D1 CONFIGURATION  
COMPONENT OFFSET  
NTSC OFFSET  
MONITOR TYPE  
RESTORE FACTORY SETUP

SELECT AND PRESS ENT

## To specify the installed optional boards

- 1** Set the cursor to **OPTION INSTALLATION** on the **MONITOR CONFIGURATION** menu and press the **ENT** button.  
The **OPTION INSTALLATION** menu 1 is displayed.

OPTION INSTALLATION 1	
■ AUTO SETUP	YES
D1 OPTION	YES
D2 OPTION	YES
NTSC DECODER	YES
NTSC COMB ADP	YES
PAL DECODER	YES
PAL COMB ADP	YES
OTHER OPTIONS	
SELECT AND PRESS ENT	

- 2** By pressing the  $\downarrow$  button, move the cursor to the board for which the YES/NO setting must be changed, and press the **ENT** button.  
YES must be displayed for the installed board and NO for uninstalled boards. Pressing the **ENT** button toggles the YES/NO setting.

Repeat step 2 for the other boards as necessary.

- 3** Move the cursor to **OTHER OPTIONS** and press the **ENT** button.  
The **OPTION INSTALLATION** menu 2 is displayed.

OPTION INSTALLATION 2	
■ PAL-M DECODER	YES
SECAM DECODER	YES
RGB/COMP O/P	YES
VITC BOARD	YES
SAFE AREA	YES
BLACK GENER	YES
OTHER OPTIONS	
SAVE AND APPLY	
SELECT AND PRESS ENT	

- 4** Set YES/NO for the boards listed in menu 2 in the same manner as with menu 1.
- 5** When the YES/NO setting is completed, move the cursor to **SAVE AND APPLY** and press the **ENT** button.  
The message "DATA SAVED" is momentarily displayed and the monitor returns to normal status.

## Section 1 Operation

### To specify the system in which D-1 signals are to be received

Before starting the following procedure, set D1 OPTION of the above OPTION INSTALLATION menu 1 to YES.

- 1 Move the cursor with the ↓ button to D1 CONFIGURATION on the MONITOR CONFIGURATION menu and press the ENT button.  
The D1 CONFIGURATION menu is displayed.

**D1 CONFIGURATION**

■ PAL      \*

NTSC

SECAM

SPECIFY SETTING OF LOCAL  
SWITCH ON BV BOARD

SELECT AND PRESS ENT

The asterisk indicates the current setting.

- 2 Move the cursor with the ↓ button to the system matching setting of the local switch on the BV board.
- 3 Press the ENT button.  
The message "DATA SAVED" is momentarily displayed and the monitor returns to normal status.

### To set the setup level for component signals

- 1 Move the cursor with the ↓ button to COMPONENT OFFSET on the MONITOR CONFIGURATION menu and press the ENT button.  
The COMPONENT OFFSET menu is displayed.

**COMPONENT OFFSET**

■ N-10/SMPTE      \*

BETACAM 0

BETACAM 7.5

SELECT AND PRESS ENT

The asterisk indicates the current setting.

- 2 Move the cursor with the ↓ button to the appropriate setup level.  
**N-10/SMPTE:** When supplying the 100/0/100/0 component signals.  
**BETACAM 0:** When supplying the 100/0/75/0 component signals.  
**BETACAM 7.5:** When supplying the 100/7.5/75/7.5 component signals.

- 3** Press the ENT button.  
The message "DATA SAVED" is momentarily displayed and the monitor returns to normal status.

### To set the setup level of NTSC signals

- 1** Move the cursor with the ↓ button to NTSC OFFSET on the MONITOR CONFIGURATION menu and press the ENT button.  
The NTSC OFFSET menu is displayed.

NTSC OFFSET	
■ 0 PERCENT	*
7.5 PERCENT	
SELECT AND PRESS ENT	

The asterisk indicates the current setting.

- 2** Move the cursor with the ↓ button to the appropriate setup level.  
**0 PERCENT:** When supplying 0 IRE NTSC signals.  
**7.5 PERCENT:** When supplying the 7.5 IRE NTSC signals.
- 3** Press the ENT button.  
The message "DATA SAVED" is momentarily displayed and the monitor returns to normal status.

### To define the model of your monitor

- 1** Move the cursor with the ↓ button to MONITOR TYPE on the MONITOR CONFIGURATION menu and press the ENT button.  
The MONITOR TYPE menu is displayed.

MONITOR TYPE	
■ BVM-1311/1411	
BVM-1911/2011	
BVM-1316/1416	*
BVM-1916/2016	
SELECT AND PRESS ENT	

The asterisk indicates the current setting.

- 2** Move the cursor with the ↓ button to the model name of your monitor.
- 3** Press the ENT button.  
The message "DATA SAVED" is momentarily displayed and the monitor return to normal status.

## Section 1 Operation

### To restore the factory setup

- 1 Move the cursor with the ↓ button to RESTORE FACTORY SETUP in the MONITOR CONFIGURATION menu and press the ENT button.  
The following message is displayed.

**RESTORE FACTORY SETUP**

**WARNING !!  
THIS WILL DESTROY ALL  
MANUALLY ENTERED DATA  
AND CONFIGURATIONS**

**PRESS ENT TO CONFIRM  
OR ESC TO QUIT**

- 2 Press the ENT button.  
All the changed menu options return to the factory-set conditions.

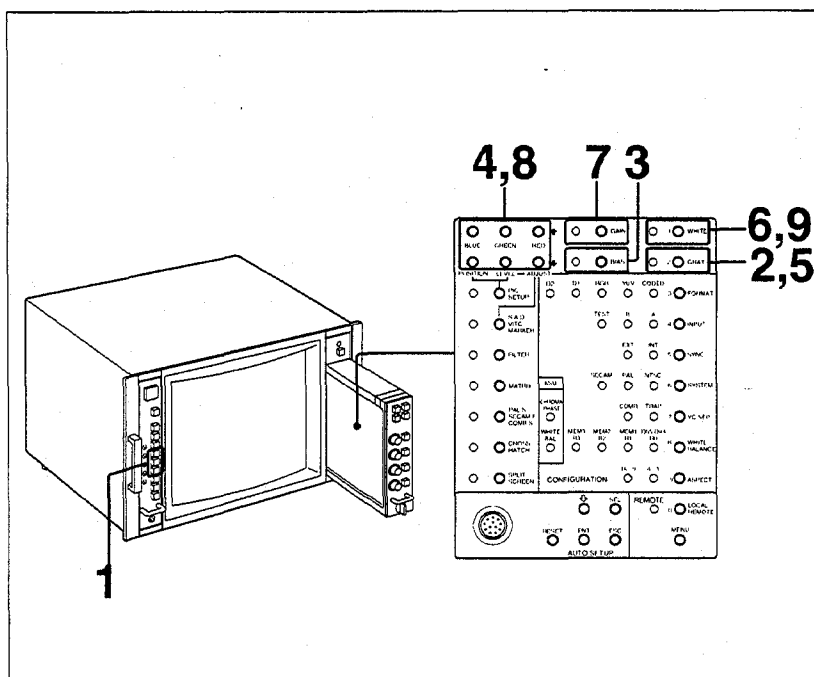
To cancel the restoration, press the ESC button before pressing the ENT button in step 2.



## 1-5. Picture Adjustments

### 1-5-1. White Balance Adjustment

During the adjustment, turn the red green and blue beams on and off with the SCREEN switches on the front panel as required.



- 1** Display a test signal on the screen.
- 2** Press the GRAY button.  
The associated lamp lights and the internal gray signal is displayed on the screen.
- 3** Press the BIAS button.  
The associated lamp lights.
- 4** Adjust the white balance at the lowlight by pressing the BLUE, GREEN and RED buttons  $\uparrow$  or  $\downarrow$ .
- 5** Press the GRAY button again.  
The associated lamp goes off and the internal gray signal disappears.
- 6** Press the WHITE button.  
The associated lamp lights and the internal 100% white signal is displayed on the screen

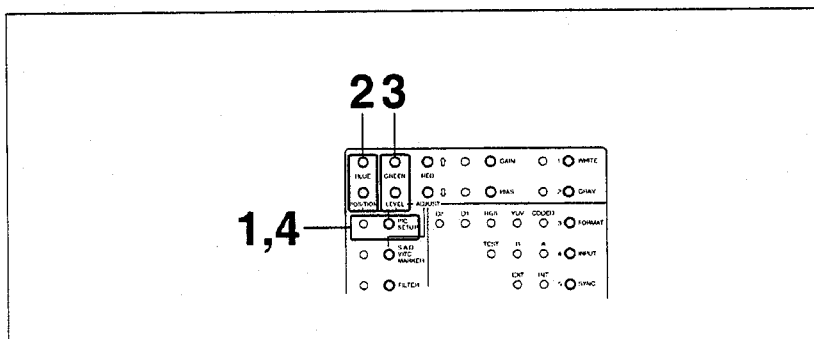
## Section 1 Operation

- 7** Press the GAIN button.  
The associated lamp lights.
- 8** Adjust the white balance at the highlight by pressing the BLUE, GREEN and RED buttons ↑ or ↓.
- 9** When the adjustment is completed, press the WHITE button so that the lamp goes off and the white signal disappears.

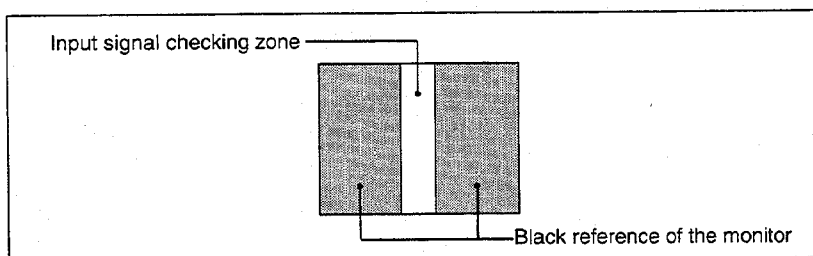
*For white balance adjustment using a color analyzer or equivalent, see Section 2.*

### 1-5-2. Black Level Adjustment

Match the black reference of the monitor with the black level of the input signal to be monitored.



- 1** Press the PIC SETUP button.  
The associated lamp lights and a vertical picture band and the black reference of the monitor are displayed on the screen.



- 2** Press the POSITION buttons ↑ or ↓ to move the position of the picture band horizontally so that the black signal of the picture is located next to the black reference area.
- 3** Press the LEVEL buttons ↑ or ↓ to match the brightness of the black reference area with that of the input black signal.
- 4** Press the PIC SETUP button again.

## 1-6. Specifications

### General

#### System

BVM-1316: 525 lines per picture, 60 fields per second interlaced, NTSC

BVM-1416P: 625 lines per picture, 50 fields per second interlaced, PAL

#### CRT

Super Fine Pitch Trinitron 0.25 mm aperture grille pitch, 90-degree deflection, 29 mm dia. in-line gun

Effective picture size:

200.3 × 267.2 mm (h/w) (8 × 10<sup>5</sup>/<sub>8</sub> inches)

330.8 mm (13 inch) picture measured diagonally

#### Picture tube protection

EHT (Extremely High Tension) is shut off in the event of scan failure.

#### Warm up

30 min to meet specifications

#### Anode voltage

Properly adjusted HV 25 kV at zero beam current

#### Power consumption

Typical: 125 W

Maximum: 155 W

#### Power requirements

BVM-1316: 100-120 V AC ±10%, 50/60 Hz

BVM-1416P: 220-240 V AC ±10%, 50/60 Hz

#### Dimensions

426 × 281.5 × 489 mm (w/h/d)

(16 <sup>7</sup>/<sub>8</sub> × 11 <sup>1</sup>/<sub>8</sub> × 19 <sup>3</sup>/<sub>8</sub> inches)

including projecting parts and controls

#### Mass

28.5 kg (61 lb 12 oz)

### Inputs/outputs

#### Video inputs

BNC type (5 inputs with 5 loop-through outputs)

VIDEO A/B, TEST, R/G/B:

0.7 Vp-p noncomposite video signal,

or 1 Vp-p composite video signal, ±6 dB positive, high-impedance

Y: Composite, 1.0 Vp-p ±6 dB, high-impedance

R-Y/B-Y: 0.7 Vp-p ±6 dB, high-impedance

#### Sync input

EXT SYNC: BNC type (1 input with 1 loop-through output)

1 to 8 Vp-p negative, high-impedance

#### Input return loss

More than 46 dB (7 MHz with 75-ohm termination)

#### Hum rejection

Reduced by more than 50 dB

Maximum hum: Less than 4 Vrms, where hum is applied to the monitor in floating ground mode

## Section 1 Operation

Video outputs	DECODER OUT: BNC type (3) Output decoded signals only when BKM-1440 is installed.
Remote control	REMOTE: 10-pin connector (1)
Auto set-up	12-pin connector (1)

### Video signal

#### Luminance channel (RGB and composite signals)

Differential gain	Within 5% for a luminance from 0 to 138 cd/m <sup>2</sup>
Differential phase	Within 5° for a luminance from 0 to 138 cd/m <sup>2</sup>
Frequency response	Monochrome mode: 100 Hz to 6 MHz $\pm 1$ dB (aperture correction at 0) Color mode: Trap filter removes frequency in 3.58 MHz region (BVM-1316) or 4.43 MHz (BVM-1416P) region

#### Chrominance channel

Demodulation axis	R-Y, B-Y
Bandpass	1.3 MHz equiband
Subcarrier regeneration	$\pm 1^\circ$ (standard input signal)
Phase control range	More than $\pm 15^\circ$ (standard input signal)
Chroma gain control range	More than $\pm 6$ dB

#### Chrominance/luminance

Time error	Less than 30 ns
Gain error	Less than 5%
Aperture correction	Adjustable continuously up to 6 dB boost at 4.5 MHz or 6.5 MHz (selectable)

#### DC restoration (RGB and composite signals)

Back porch type  
Back porch level: Within 1% of peak luminance, 10% to 90% (average picture level)

### Synchronization

AFC time constant	0.5 ms (fast), 2 ms (normal) or 7 ms (slow)
Line pull range/line hold range	More than $\pm 500$ Hz at 0.5 ms time constant
Vertical blanking time	Normal: Within 1 ms Underscan: Within 0.8 ms
Horizontal retrace time	Within 10 $\mu$ s

**Picture performance**

Normal scan	5% overscan of CRT effective screen area (adjustable range more than $\pm 15\%$ )
Underscan	3% underscan of CRT effective screen area (adjustable range more than $\pm 15\%$ )
Linearity	Within a central area bounded by a circle whose diameter equals the picture height, within 1% of the picture height, out of area 2%
Color temperature	D65, adjustable to other color temperatures
Nominal chromaticity coordinates	

BVM-1316: SMPTE C phosphor

	x	y
Red	0.630	0.340
Green	0.310	0.595
Blue	0.155	0.070

BVM-1416P: EBU standard phosphor

	x	y
Red	0.64	0.33
Green	0.29	0.60
Blue	0.15	0.06

Convergence error	Central area: Less than 0.5 mm Periphery: Less than 1.0 mm
Calibrated contrast	138 cd/m <sup>2</sup> at peak white of standard 1 Vp-p signal
Raster size stability	Less than 1% picture height, 0% to 100% APL at 138 cd/m <sup>2</sup> peak luminance
Scan delay	Horizontal: Approx. $\frac{1}{4}$ line Vertical: Approx. $\frac{1}{2}$ field
Resolution	More than 600 TV lines (center, at 138 cd/m <sup>2</sup> luminance)

**Environment**

Operating temperature	0° C to 40° C (32° F to 104° F)
Optimum temperature range	20° C to 30° C (68° F to 86° F)
Humidity	0 to 90%
Altitude	Approx. 3,050 m (10,000 feet) max.



## Section 1 Operation

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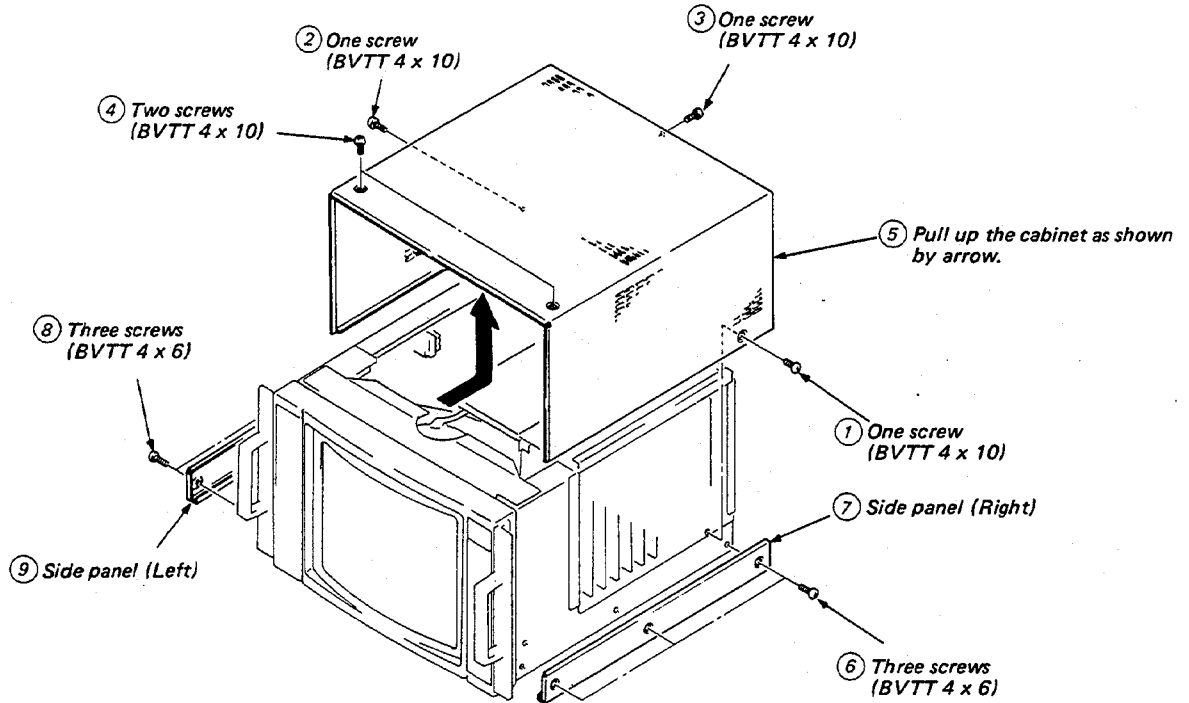
### **Supplied accessories**

AC power cord (1)  
Cord stopper (1)  
Screwdriver (1)  
Drawer keys (2)  
Extension board (1)  
10-pin connector (1)  
Fuses (2)  
Tally number plates (1 set)  
Operation and maintenance manual (1)

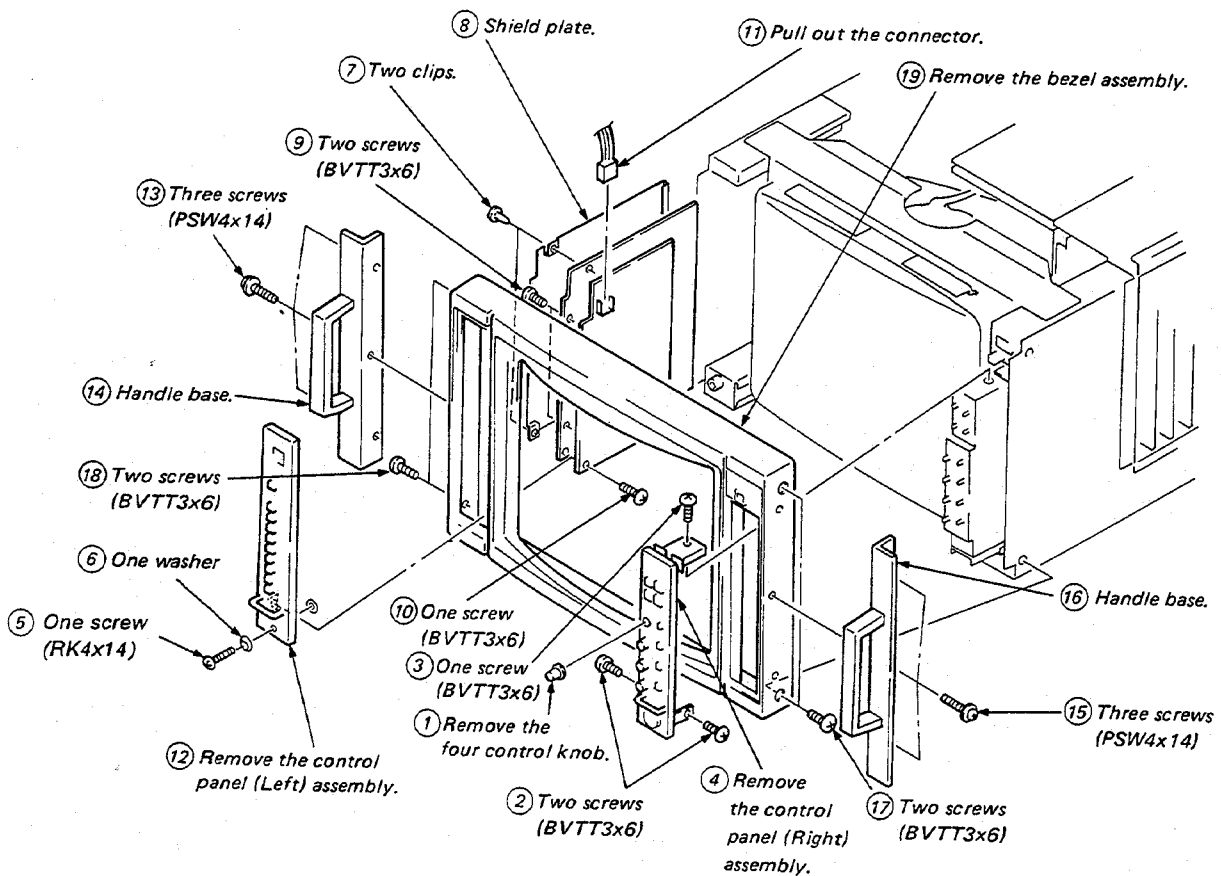
Design and specifications are subject to change without notice.

## SECTION 2 DISASSEMBLY

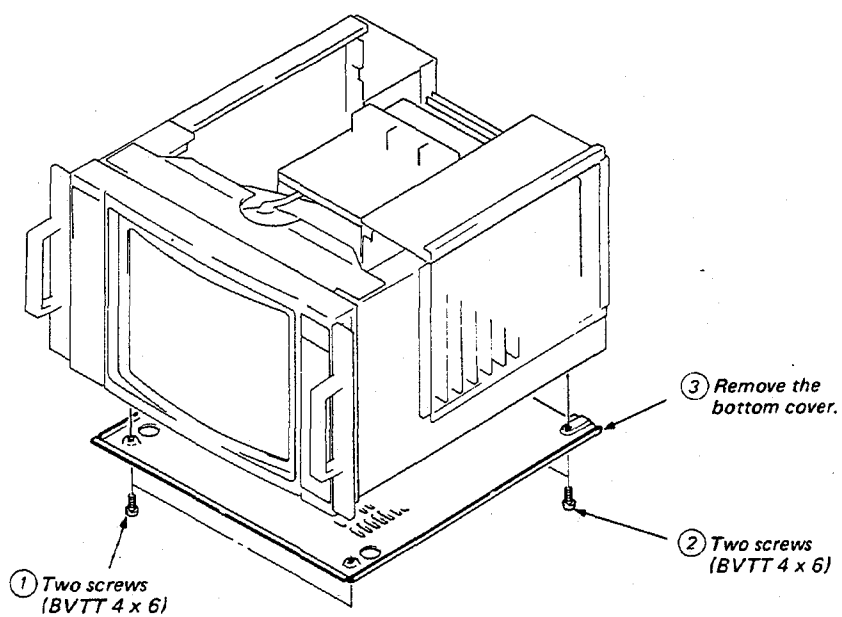
### 2-1. CABINET REMOVAL AND THE SIDE PANELS



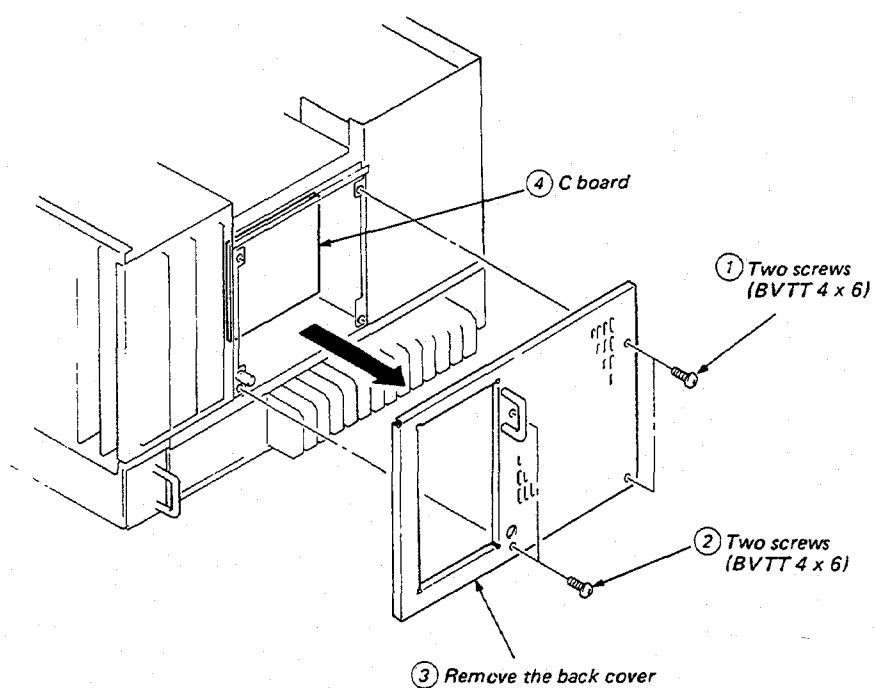
### 2-2. BEZEL ASSEMBLY REMOVAL



### 2.3. BOTTOM COVER REMOVAL

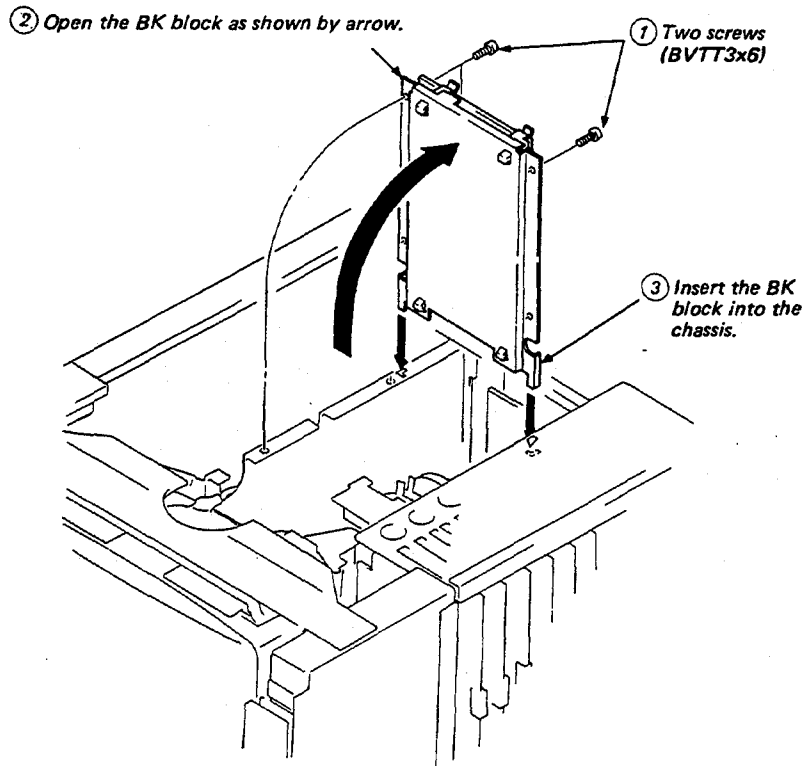


### 2.4. CHECK OF C BOARD

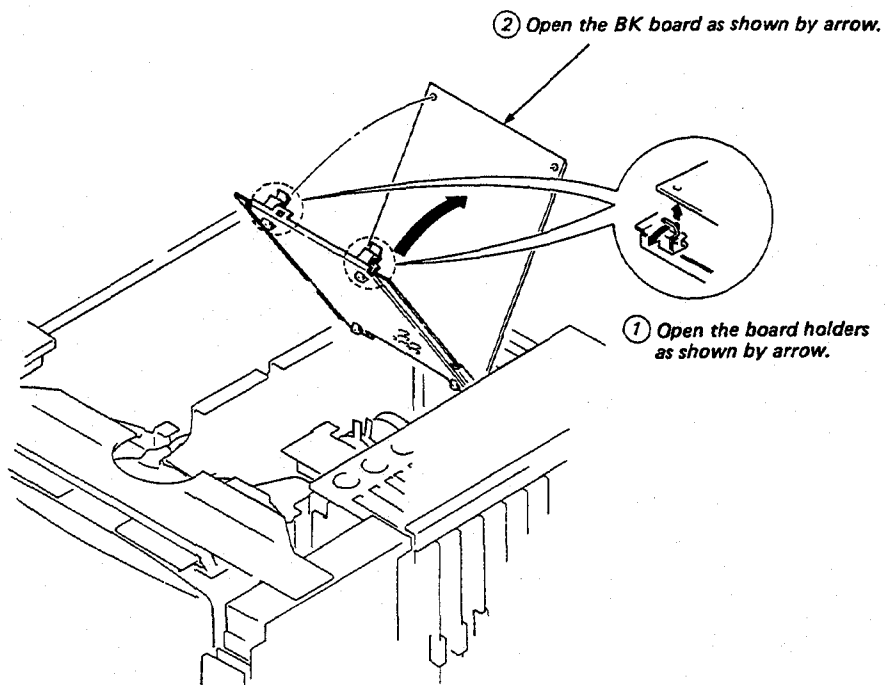




## 2-5. BK BLOCK REMOVAL

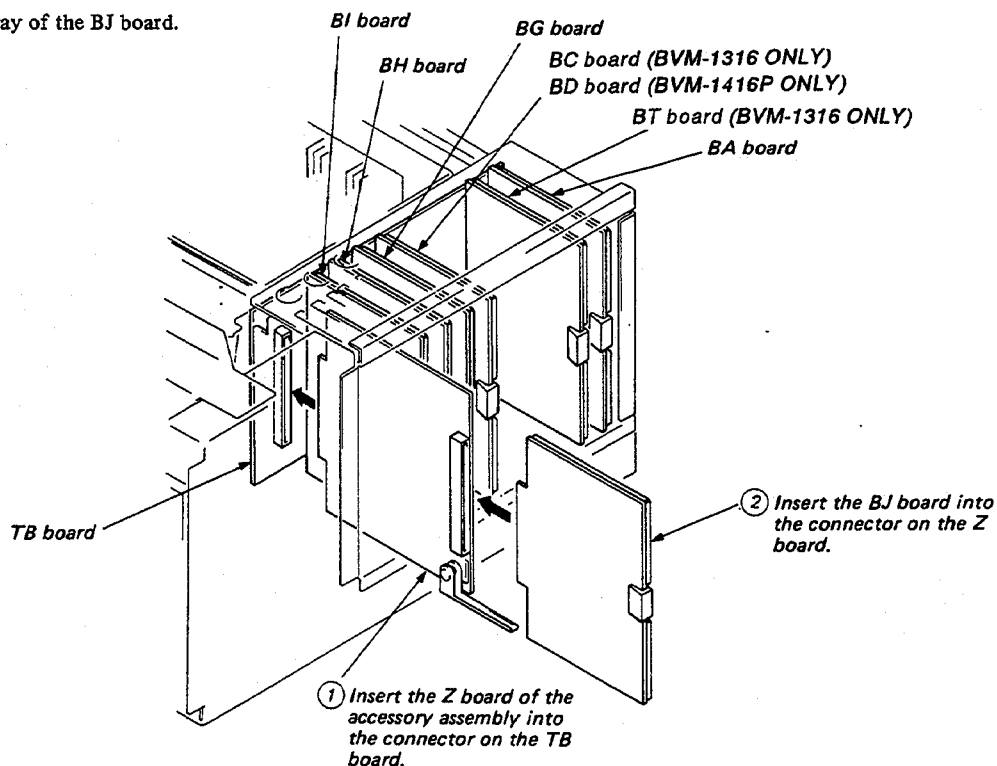


## 2-6. CHECK OF BK BOARD

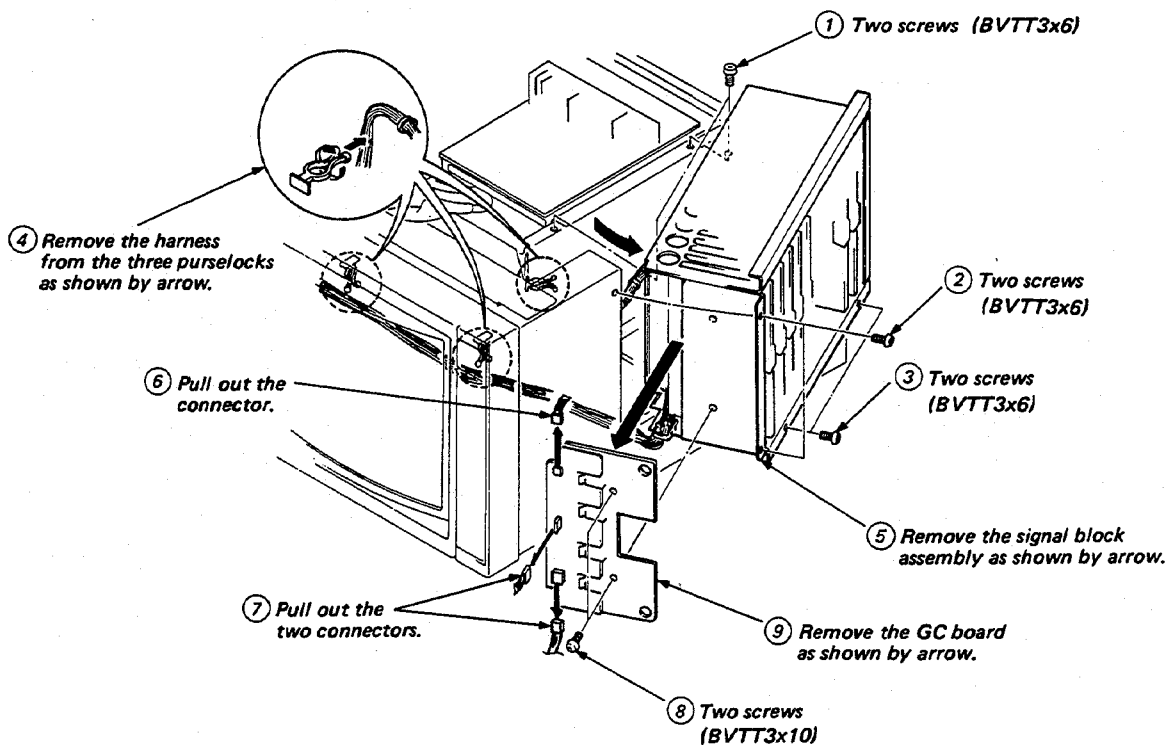


## 2-7. CHECK OF BA, BT, BC, BD, BG, BH, BI AND BJ BOARDS

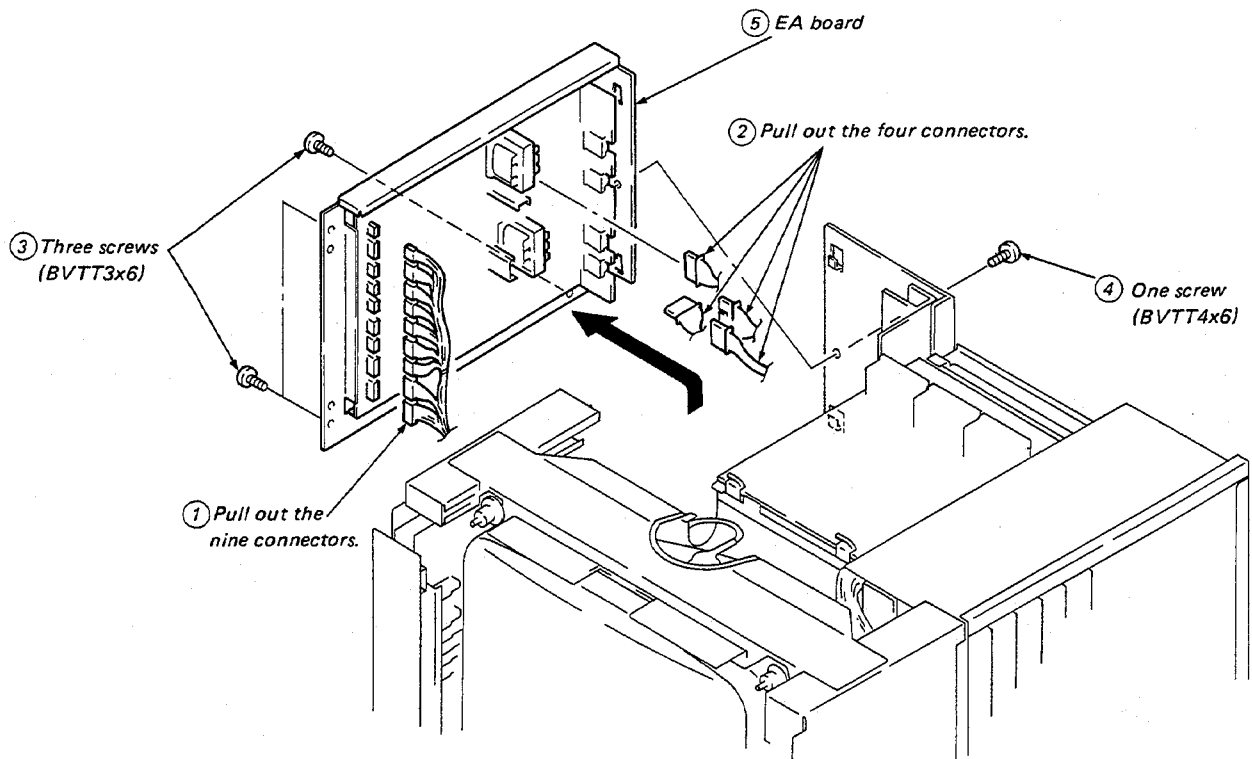
**Note:** The BA, BT, BC, BG, BH, and BI boards can be checked in the same way of the BJ board.



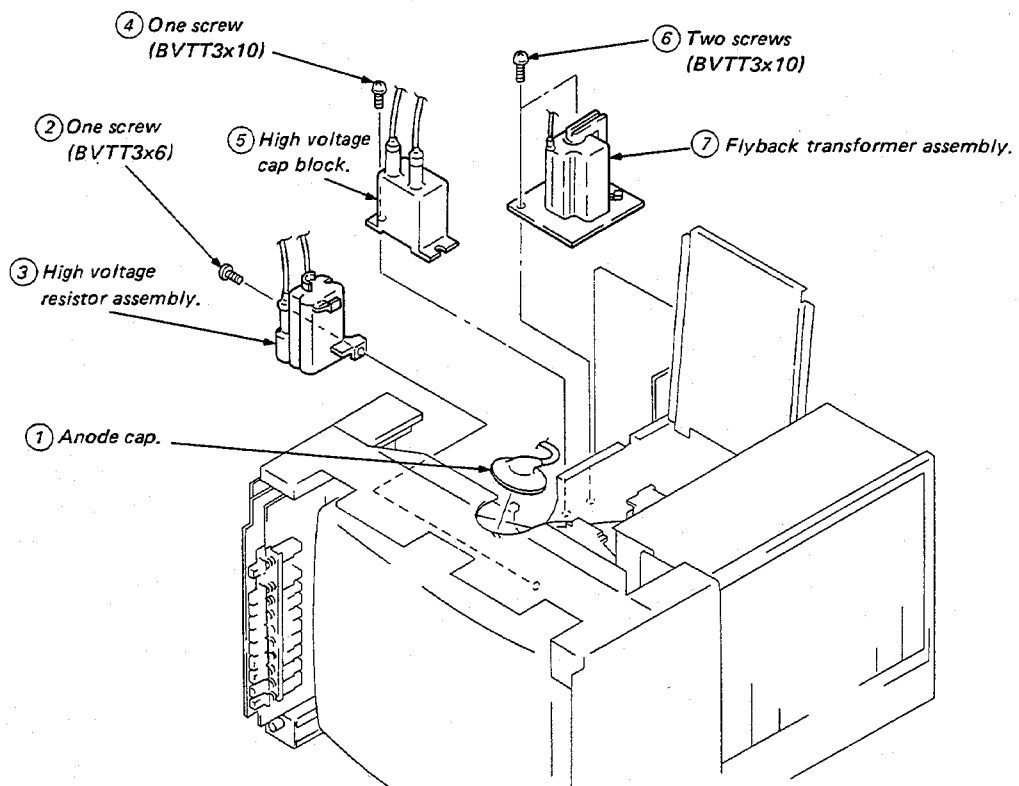
## 2-8. GC BOARD REMOVAL



## 2-9. EA BOARD REMOVAL

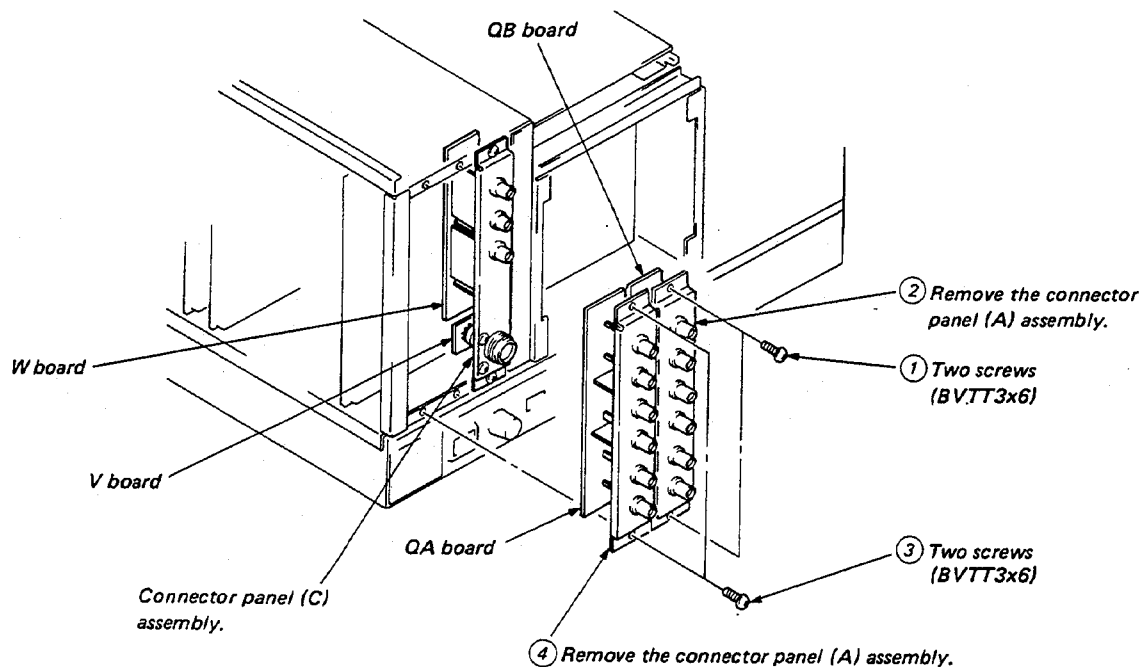


## 2-10. FLYBACK TRANSFORMER AND HIGH VOLTAGE BLOCK REMOVAL

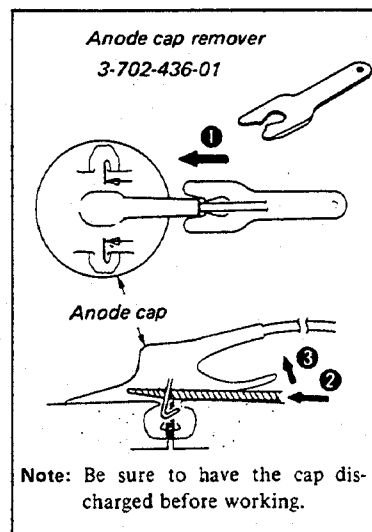
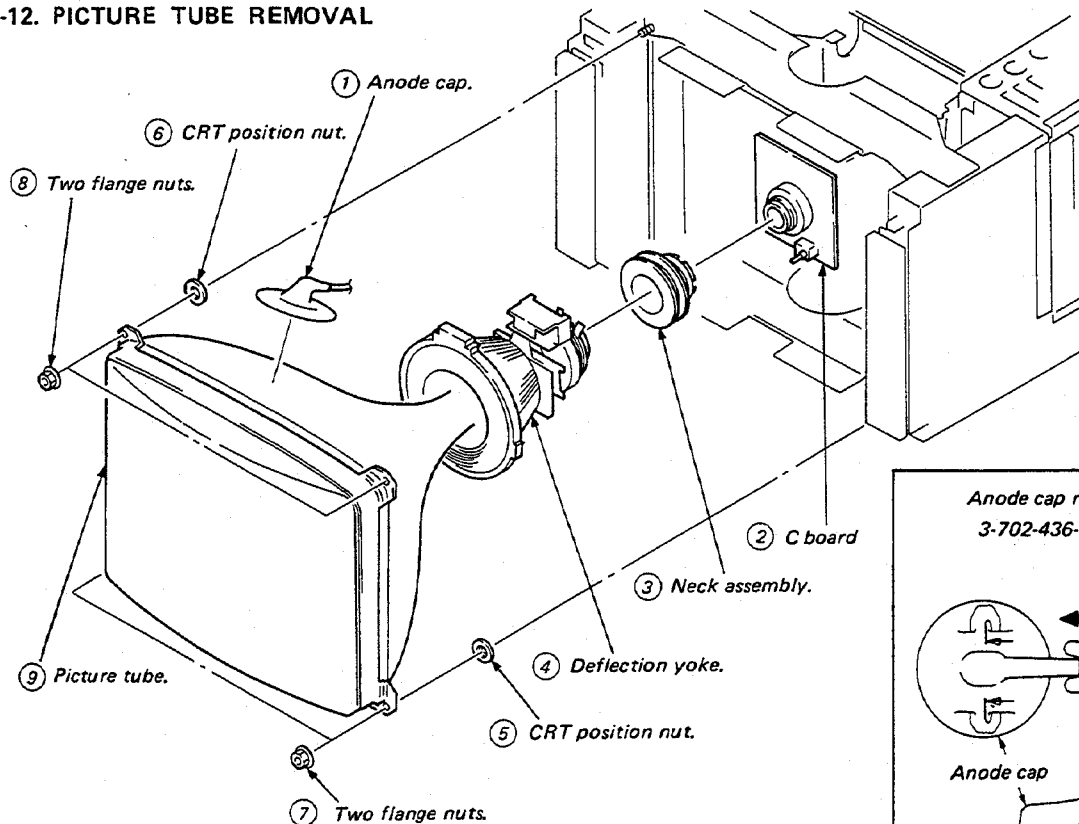


## 2-11. QA, W AND V BOARDS REMOVAL

**Note:** Connector panel (C) assembly can be removed in the same way.

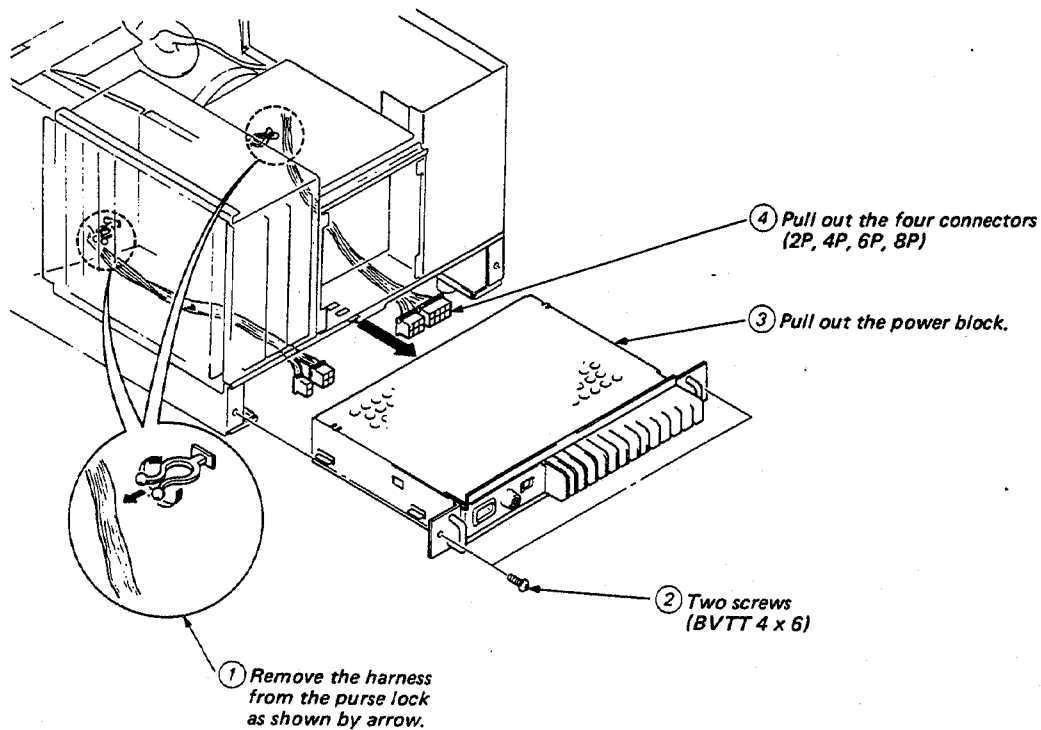


## 2-12. PICTURE TUBE REMOVAL

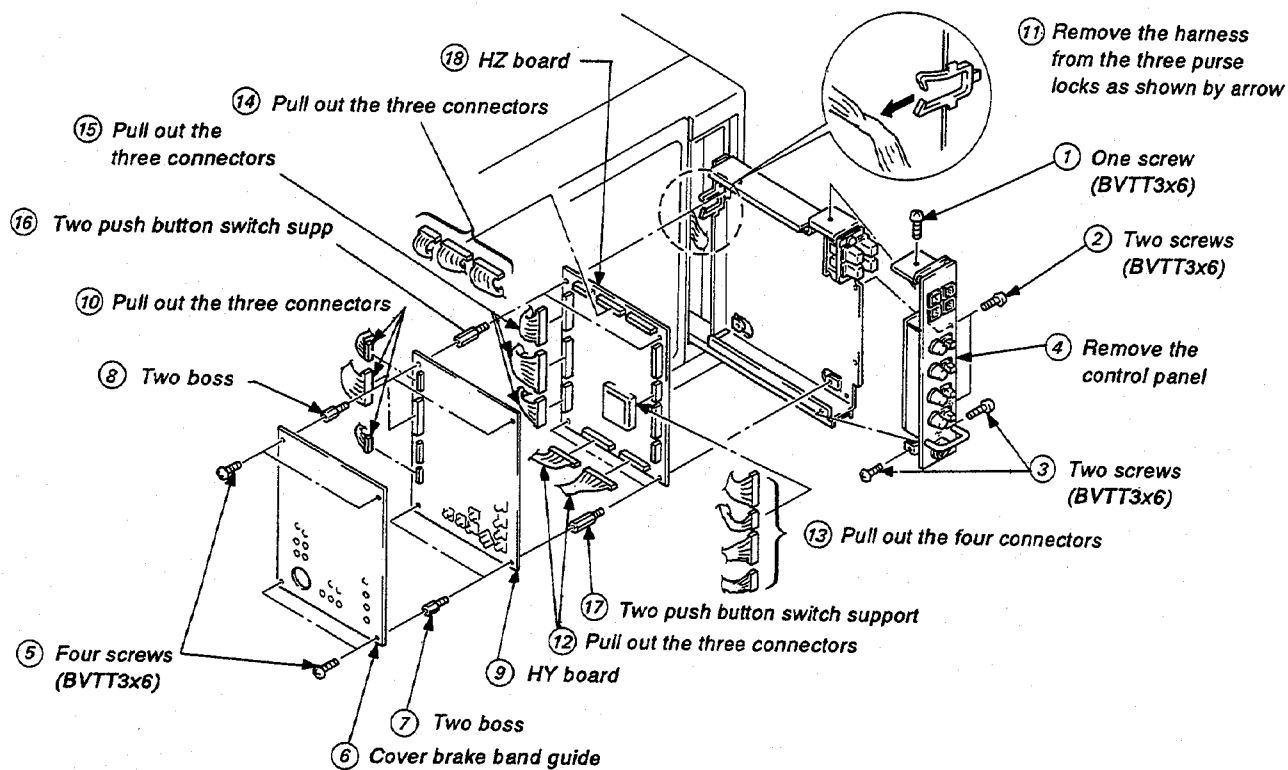


## 2-13. POWER BLOCK ASSEMBLY REMOVAL

Note: Remove the bottom cover before the follow operations.



## 2-14. HW BOARD AND HZ BOARD REMOVAL



## SECTION 3 CIRCUIT DESCRIPTIONS

### 3-1. QA, QB, BA BOARDS

#### 3-1-1. Input Circuit

##### Cable Compensation (QA, QB)

CABLE COMPENSATION is composed of inductance L and capacitor C1 (Figure 1) in QA board and performs return loss compensation.

Grounding or floating in input terminal can be selected by switch S1.

On floating mode, common mode rejection can be performed. QB board also has same function.

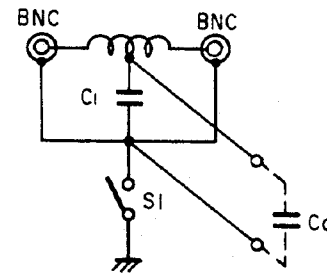


Figure 1

##### Hook Up Circuit (BA)

This circuit is composed of transistors Q101-105 and performs common mode rejection when SW S1 is selected to the floating mode.

In Figure 2, Gains of amplifier for input A and B are derived as follows.

$$A = \frac{R_c}{R_i} : \text{Gain of amplifier for input A}$$

$$B = -\frac{R_c}{R_i} : \text{Gain of amplifier for input B}$$

When input  $(e_c + e_i)$  is applied to input A and input  $(e_c - e_i)$  to input B, then output  $e_o$  is

$$e_o = \frac{R_c}{R_i} (e_c + e_i) + (-\frac{R_c}{R_i}) (e_c - e_i) = 2 \frac{R_c}{R_i} e_i$$

This equation indicates that  $e_c$  is eliminated and there is no common mode signal in output signal.

On hook up circuit, NF Amplifier (Negative Feedback) is used to get frequency response flat.

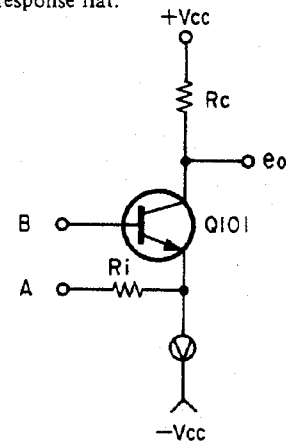


Figure 2

##### Input Select Sw, Sync Select SW (BA)

For composite video signal, VIDEO A/B/TEST mode is selected by INPUT SELECT SW (IC1). For sync signal, INT SYNC/EXT SYNC is selected by SYNC SELECT SW IC2.

#### 3-1-2. Sync AGC Circuit

This circuit is composed of following components; LPF (Low Pass Filter) (Q701), variable gain amplifier (Q702-Q705), bias control circuit (Q708-Q710), gain control circuit (Q711, 712) and amplifier (Q706, 707). Figure 3 shows block diagram of this circuit.

An inverted composite video signal or composite sync signal ( $e_o$ ) is derived at the collector of transistor Q707.

The bias control circuit compares maximum value of  $e_o$  with base voltage of Q708 (E1) and controls bias of amplifier so that they match.

Also the gain control circuit compares pedestal level of  $e_o$  with base voltage of Q711 (E2), and controls variable gain amplifier so that they match.

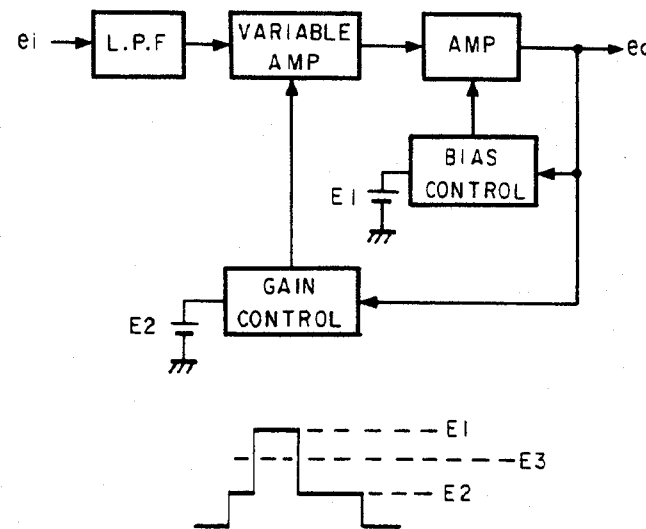


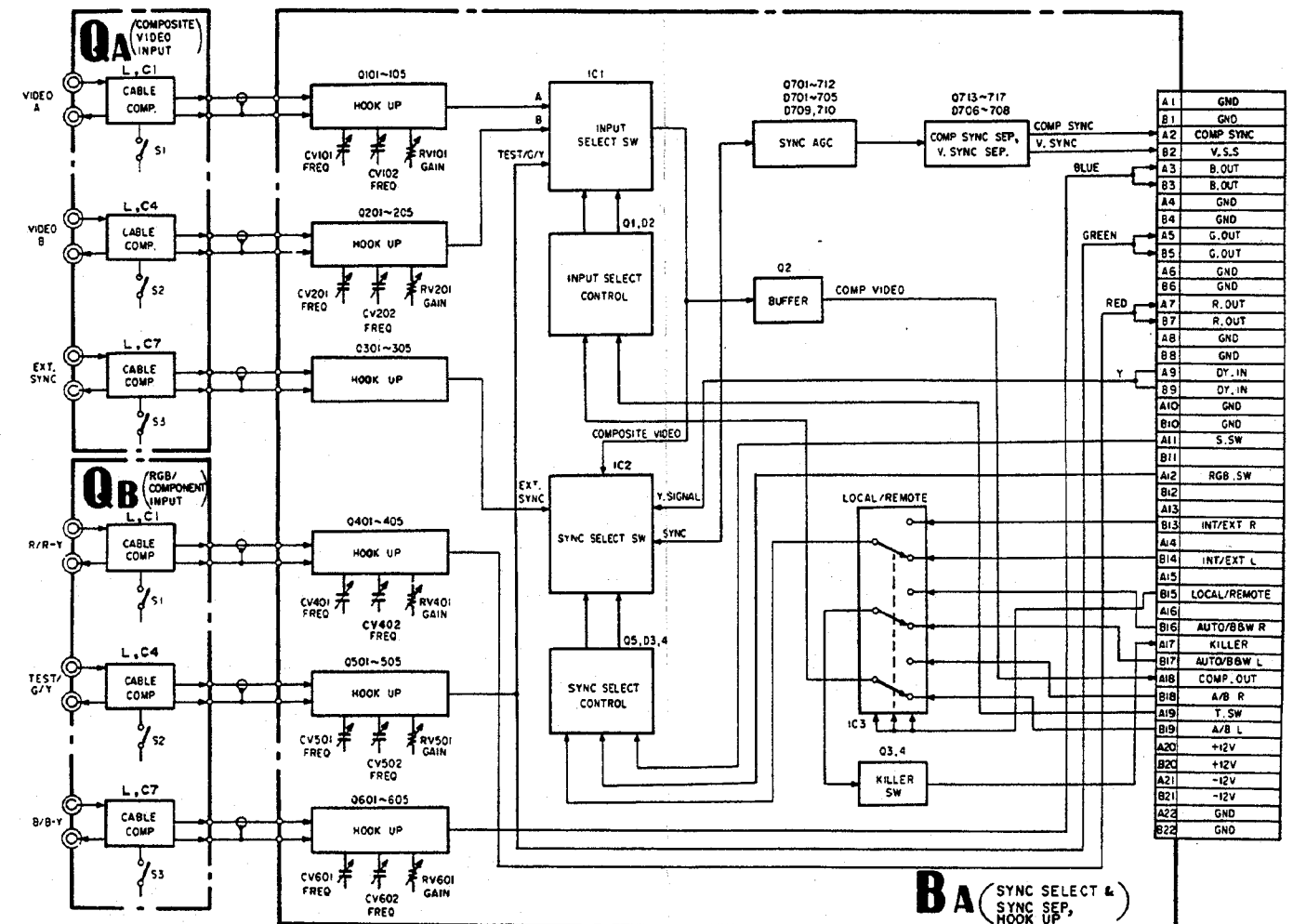
Figure 3

##### Composite Sync Separation, Vertical Sync Separation

Composite sync is separated from composite video signal or composite sync by comparing voltage  $e_o$  with the base voltage of transistor Q713 (E3).

Horizontal component in composite video signal or composite sync signal is removed by LPF (Low Pass Filter, Q716) and Vertical sync is separated by transistor Q717.

### BLOCK DIAGRAM OF QA, QB, BA BOARDS



### 3-2. BG BOARD

#### 3-2-1. Luminance Signal Circuit

##### Filter SW

IC1 works as a selector switch of composite video signal or luminance signal derived from Y/C separation circuit. This IC activates by either FILTER-SW in right side drawer or killer signal.

##### Aperture Control

Aperture control circuit is composed of DL1 (delay line), transistors Q5, 7, 8 and IC2. IC2 operates as a variable resistor. Resistance value between Pin ① and ③ is controlled by the potential between pin ③ and pin ④, also pin ① and pin ⑥.

Input signal:  $e_{r0}$ .

Delayed signal by delay line:  $e_{r1}$ .

Second delayed signal:  $e_{r2}$ .

See Figure 4

$e_1$  (at base of transistor Q5) is obtained as below due to the combination of direct wave and reflected wave by DL1.

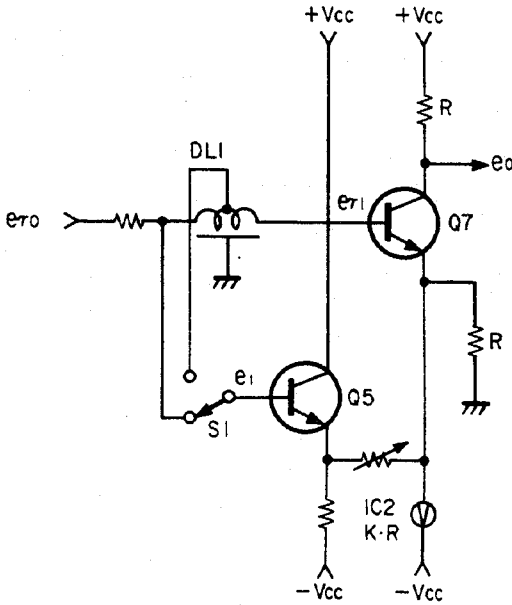


Figure 4

$$e_1 = (e_{r0} + e_{r2})/2$$

Therefore  $e_o$  is

$$e_o = -\left(e_{r1} + \frac{1}{K} \left(e_{r1} - \frac{1}{2}(e_{r0} + e_{r2})\right)\right)$$

1st term                      2nd term

K: variable constant

In the above equation, 1st term shows waveform A in Figure 5 and 2nd term shows waveform B. When K is variable, amount of pre-shoot and overshoot can be varied.

Switch S1 is used for selection of boost frequency.

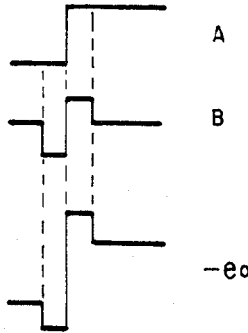


Figure 5

##### Y Delay, Y Buffer Amplifier

Y/C delay time can be matched by delay line DL2 and Y signal is amplified and fed to the next stage.

#### 3-2-2. Color Gain Control Circuit

In this section (R-Y) signal processing is described as below, but (B-Y) signal is processed by the same way as (R-Y) signal.

##### R-Y Amplifier and Clamping

The R-Y color difference signal from the decoder board is amplified at the amplifier composed of transistors Q21 and Q22 and clamped at the Horizontal Sync by transistors Q23 and IC3.

##### R-Y Gain Control Amplifier

This is a variable gain control amplifier composed of variable resistor element of IC4 and transistors Q25-Q27. Gain of this amplifier can be controlled by the color gain control voltage at the pin ⑫ of IC4.

##### AGC Pulse Generator

Generates the reference pulse for AGC (Automatic Gain Control) of color gain control circuit.

##### Gain Control Amplifier for AGC Pulse

Circuit is the same as R-Y GAIN CONTROL AMPLIFIER. Gain of this amplifier is controlled by the voltage at pin ⑧ of IC4.

##### Color Gain Control

AGC pulse, which is output signal of Gain control amplifier for AGC pulse, is clamped by IC6 (2/3) and is made sampling by IC6 (3/3). Amplitude of AGC pulse and DC voltage supplied from CHROMA control on the front panel are compared and matched by IC7 (1/2) with controlling the above gain control amplifier. This control voltage is supplied to the control terminals of R-Y and B-Y gain control amplifiers and controls color gain.

#### 3-2-3. G-Y MATRIX amplifier

G-Y signal is obtained by matrixing R-Y signal and B-Y signal with the amplifier composed of transistors Q44 and Q45.

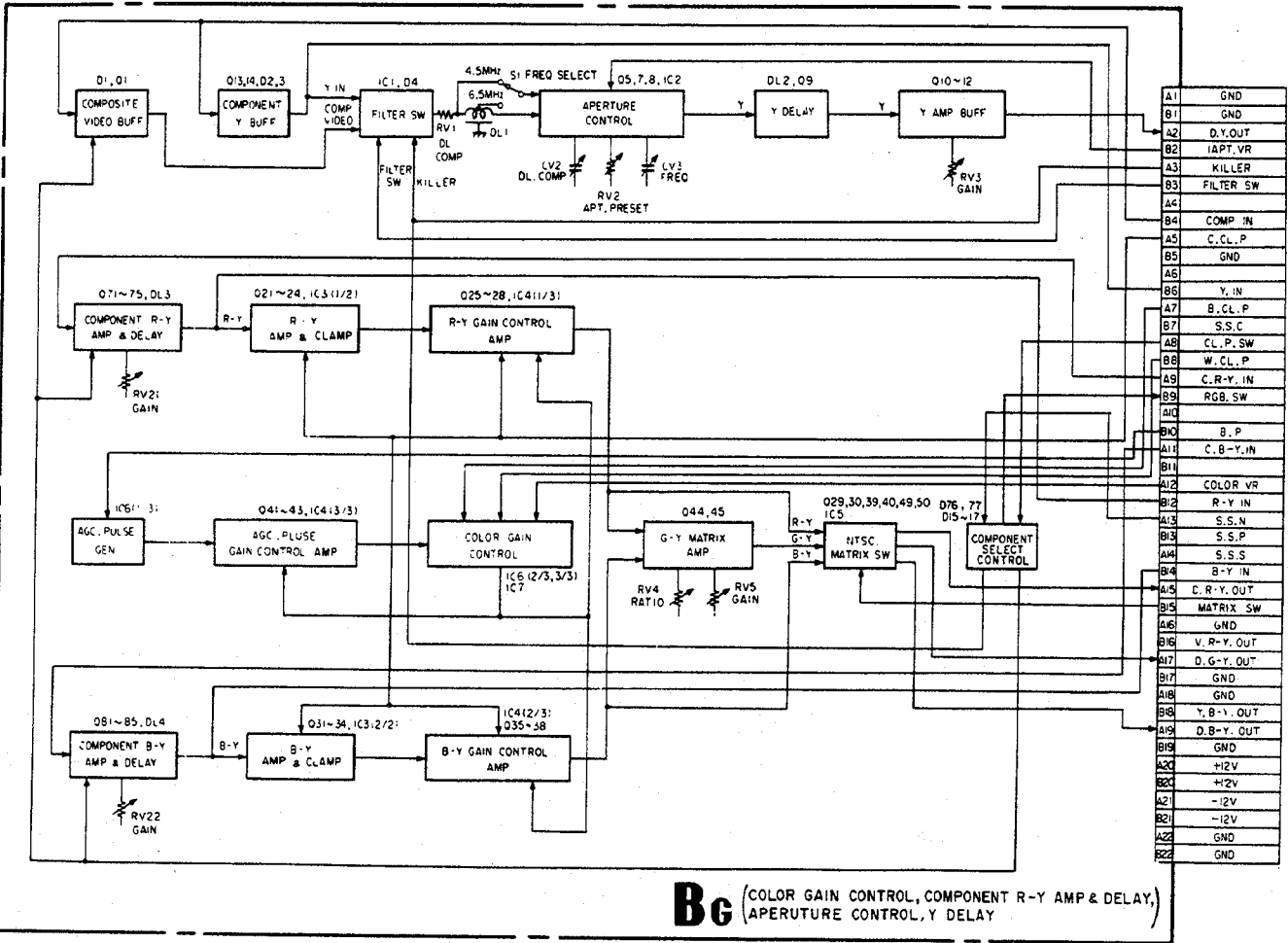
#### 3-2-4. NTSC MATRIX SW

NTSC MATRIX mode operation is obtained by the matrix circuit composed of resistor networks CP14-CP19, transistor Q29, Q30, Q39, Q40, Q49, Q50 and IC5. CP14-CP19 perform matrixing and IC5 works as a switch.

#### 3-2-5. COMPONENT R-Y Amplifier and Delay Circuit

R-Y signal of COMPONENT signal is compensated with amplitude, porality and delay time to match the R-Y signal of decoder output.

#### BLOCK DIAGRAM OF BG BOARD



3-3. BH BOARD

3-3-1. Switching Circuit Between Y (Luminance) Signal, Color Difference Signal and RGB Signal, AGC Pulse Insertion, Y-C Matrix

**Switching Circuit of Y Signal, Crosshatch Signal and SET UP Signal, Buffer**  
Y signal, crosshatch signal and SET UP signal are selected by the switcher (IC1 (1/3) (2/3)) and selected signal is output via buffer Q1.

**Switching Circuit of R-Y Signal, Red Signal and SET UP Signal (Same as B-Y, G-Y Signal)**  
R-Y signal, Red signal, SET UP signal are selected by IC2 (1/3, 2/3) and selected signal is output via buffer Q4.

**Y Signal Screening (Same as R-Y, B-Y, and G-Y Signals)**  
The signal is performed SAMPLE and HOLD (S/H) at the back porch of signal by transistor Q2 and IC5 (2/2). Y screening is performed by replacing S/H output signal, by the original signal. For color difference signals screening is made at the Horizontal Sync portion.

**Red Matrix, Blue Only SW, Buffer (Same as Green and Blue)**  
Red is obtained by Y-C matrix circuit composed of resistor network CP9 from color difference signals. AGC pulse from pulse generator is inserted into Red signal for contrast control. IC7 activates by the Blue only SW on the front panel. Blue only SW is used for the display of blue signal as a monochrome picture.

3-3-2. Contrast Control, Brightness Control, Peak Limiter

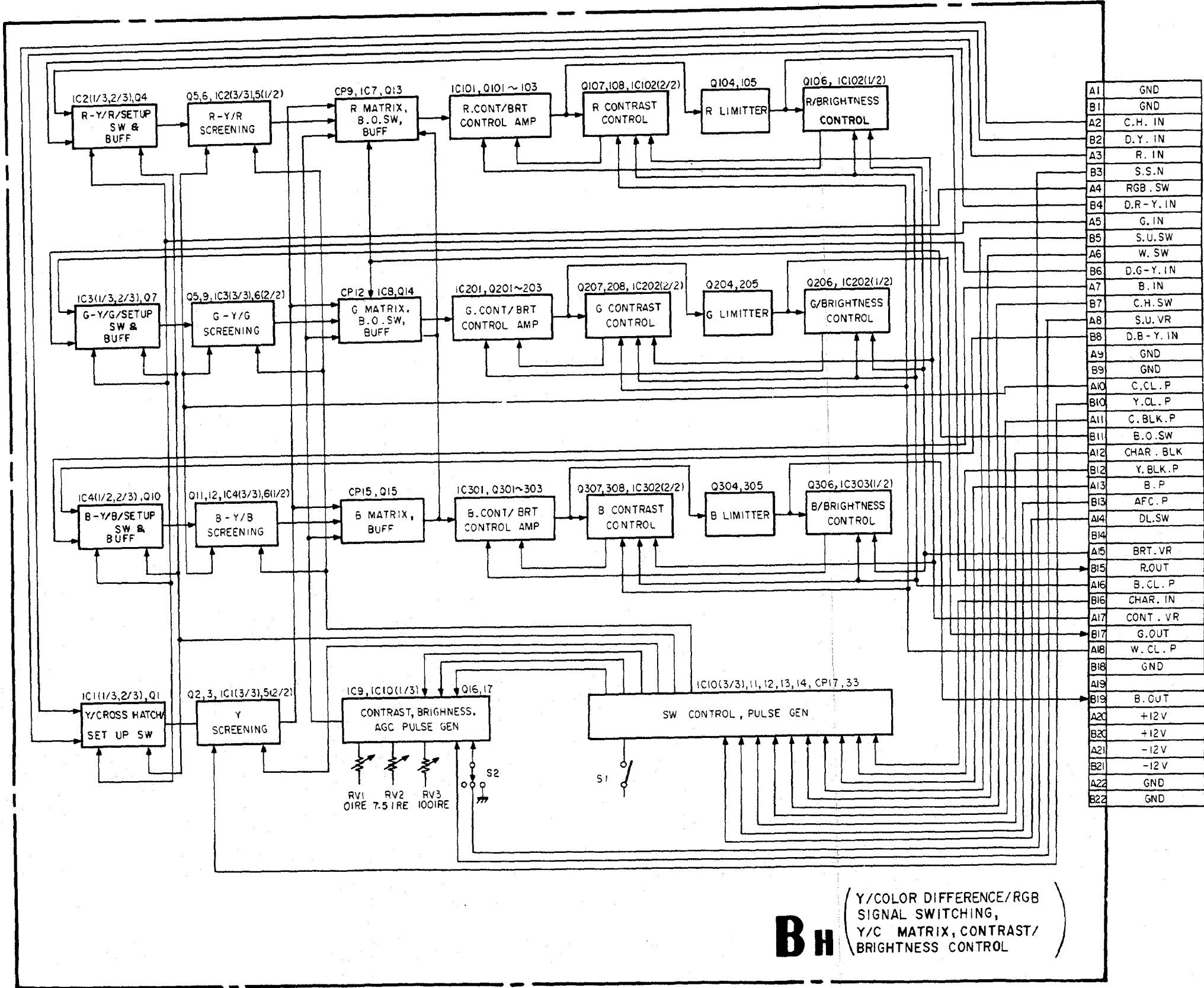
**Red Contrast, and Brightness Control Amplifier (Same as Green and Blue)**  
This is a variable gain control amplifier composed of variable resistor element IC101 and transistor Q102 and Q103. By controlling the voltage at pin ④ of IC101, contrast control is performed, and brightness control is done by controlling the bias voltage of transistor Q102.

**Red limiter (Same as Green and Blue)**  
When excess input signal comes in, amplitude is limited by the limiter composed of transistors Q104 and Q105.

**Red Contrast Control (Same as Green and Blue)**  
AGC pulse inserted in Red signal is clamped by transistor Q107 and sampled by transistor Q108. Amplitude of above AGC pulse is compared with the reference voltage applied from CONTRAST control on the front panel in IC102 (2/2). Contrast control is performed by controlling the gain of Red contrast brightness control amplifier so that these voltages may match.

**Red Brightness Control (Same as Green and Blue)**  
The black level of Red signal is performed SAMPLE and HOLD (S/H) by transistor Q106. This S/H voltage is compared with the reference voltage applied from Brightness control on the front panel in IC102 (1/2). Brightness control is performed by controlling the bias of Red contrast Brightness control amplifier so that these voltages may match.

BLOCK DIAGRAM OF BH BOARD



**BH** (Y/COLOR DIFFERENCE/RGB SIGNAL SWITCHING, Y/C MATRIX, CONTRAST/ BRIGHTNESS CONTROL)



3-4. BI BOARD  
(Same as Green and Blue)

3-4-1. Red Screen SW, AGC Pulse Insertion

Red signal can be cut off by RED SCREEN SW on the front panel. Horizontal rate AGC pulse is removed and the reference pulse is inserted in the signal for the GAIN and BIAS adjustment of video output amplifier and for the beam control circuit.

3-4-2. Red Limiter, Gain Bias Control Amplifier

This limiter is used for limiting the excess input level of the signal below 0V DC.

The GAIN/BIAS CONTROL amplifier is composed of variable resistor element and transistors as same as contrast control amplifier (See section of BH board)

3-4-3. Red Feedback Amplifier, Red Gain Control  
Red Bias Control Circuit

RED FEEDBACK amplifier inverts the phase of the signal derived from VIDEO OUTPUT amplifier via NF BUFF (Negative Feedback Buffer) in BK board.

The BIAS of VIDEO OUTPUT AMPLIFIER is controlled by RED BIAS CONTROL circuit so that the black level of inverted signal may be 0V DC.

(This time, black level of VIDEO OUTPUT will be -90V DC.)

RED GAIN CONTROL circuit controls the gain of VIDEO OUTPUT AMPLIFIER so that the level of the reference pulse may match to the voltage at pin ③ of IC103.

(When GAIN control (RED) in the drawer is turned, the level of the reference pulse inserted in section 1 changes. And amplitude (Gain) of Red signal changes so that the amplitude of the reference pulse derived from RED FEEDBACK amplifier may be maintained constant by GAIN CONTROL circuit.)

3-4-4. Red Cathode Current Detection, Red Beam  
Current Control Circuit (I-V Conversion)

Refer to the BK board section of beam control circuit

3-4-5. ABL Detector, Drive Control, Over Drive

The reference level of GAIN CONTROL circuit is controlled by ABL detector and DRIVE CONTROL so that the cathode current of CRT exceeds the predetermined (Preset) value to prevent damage of CRT. OVER DRIVE circuit lights up the OVER LOAD LED on the front panel for warning.

3-4-6. G2 Control Circuit

Circuit diagram of G2 control circuit is shown in Figure 6.

The signal for BM. CURRENT control is fed to base of the transistor Q11 from RED BM. CURRENT control circuit. (Same as G and B)

sistors Q11-Q13 is turned on and is compared with the reference voltage of base voltage Q14.

And this circuit drives transistor Q3, Q2 located in C board so that Transistor Q3, Q2 in C board drives G2 voltage for adjusting cut off level of CRT.

Base voltage of transistor Q14 (reference voltage) is set so that the voltage of Black level at CATHOD electrode may be +120V DC and maintain Ekco (cut off voltage) +120V constant.

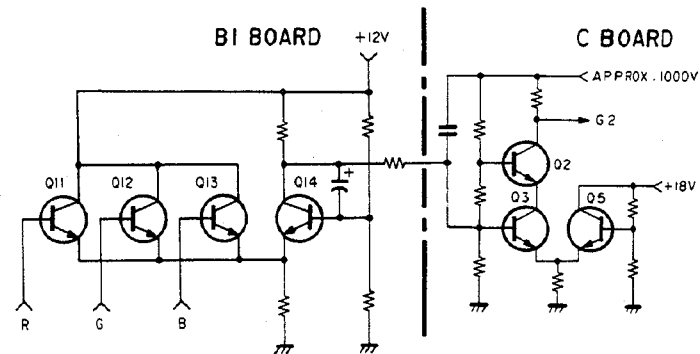
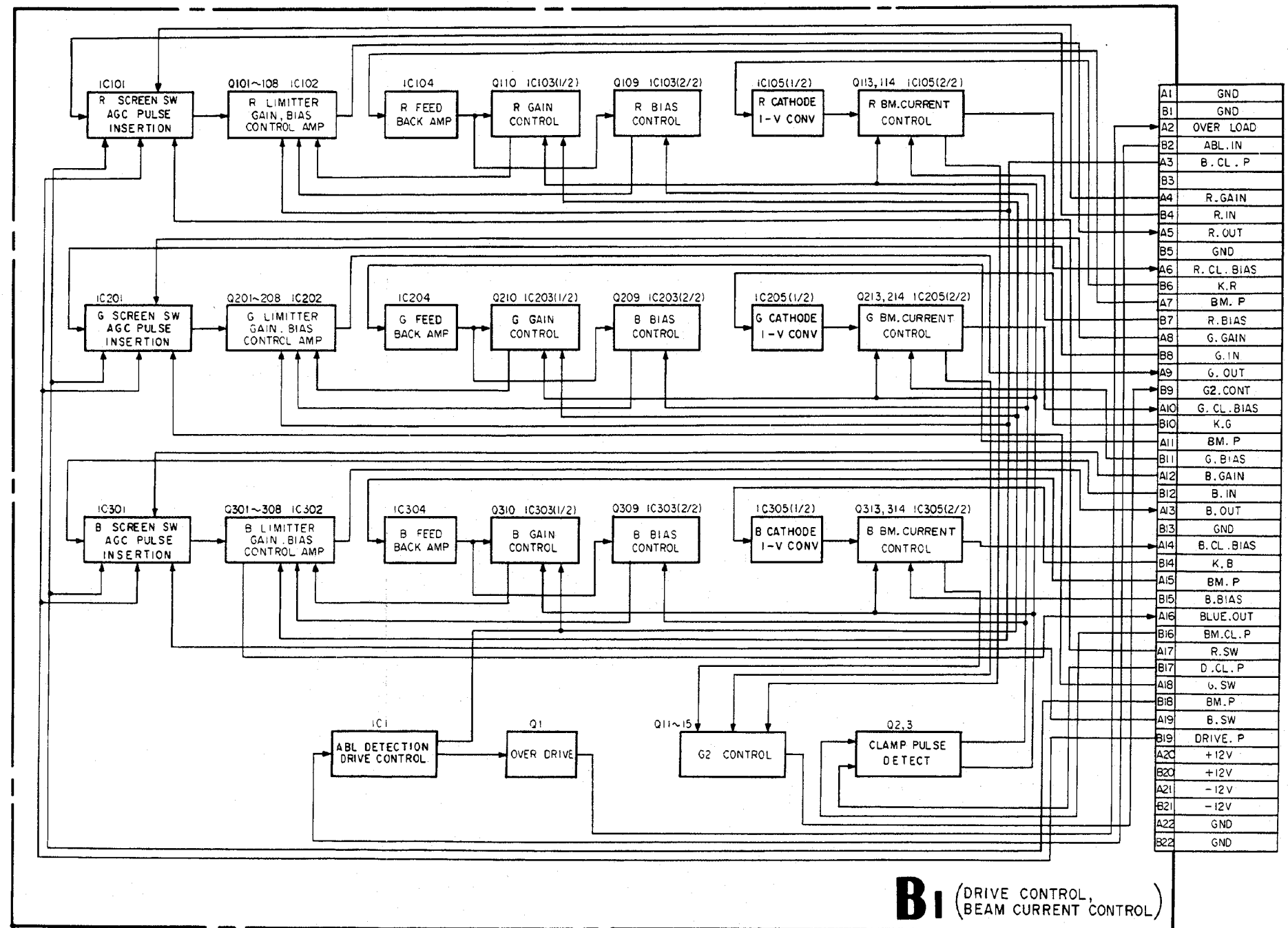


Figure 6

BLOCK DIAGRAM OF BI BOARD



### 3-5. SYNC PROCESSOR, PULSE GENERATOR (BJ BOARD)

#### 3-5-1. 1H Pulse Processing

The composite sync is separated from incoming signal at BA board. And 1H sync is made by separating V sync and equalizing pulse from composite sync. Also H sync which has constant pulse width is made from 1H sync.

#### 3-5-2. 2fH Multivibrator

This circuit generates 2fH rate pulse from H rate flyback pulse.

#### 3-5-3. Vertical Counter

The 2fH rate pulse is counted down to generate Vertical rate trigger pulse for vertical deflection circuit.

When there is no incoming signal, trigger pulse is generated by vertical counter (384H).

When there is incoming signal with V sync, this counter circuit is reset by V sync and generates trigger pulse synchronized with V sync.

Also in order to increase stability of vertical scanning, noise gating process is made during V sync period.

#### 3-5-4. V Sync and Delay

V sync and V BLANKING pulses are generated by output trigger pulse from vertical counter.

And when V DELAY SW on the front panel is selected ON, these pulses are generated in a V/2 delayed position relative to the V sync position of incoming signal.

#### 3-5-5. Crosshatch Generator

Internal crosshatch signal is made as follows.

The vertical lines are generated by approx. 18fH rate pulses synchronized with flyback pulse.

And flyback pulse is counted down to generate horizontal lines.

#### 3-5-6. Burst Gate Pulse, Y-CLAMP Pulse, C-CLAMP Pulse Generator

The Burst Gate Pulse (B.G.P.), clamp pulse for luminance signal (Y.CL.P) and clamp pulse for color difference signal (C.CL.P) are generated from 1H sync via LCR network and transistors.

#### 3-5-7. Picture Set Up Pulse Generator

This is the gate pulse generator for picture set-up function, and consists of mono multipliers.

#### 3-5-8. Split, Y Blanking, C Blanking Pulse Generator

Y BLANKING pulse (Y BLK P) and C BLANKING pulse (C BLK P) are generated. These pulses are used for the purpose of DC restoration of color difference signal, Y signal and RGB signal. DC restoration is made by inserting the black reference signal during blanking period in the signal. Also C.BLK. pulse is mixed with vertical rate blanking signals for SPLIT display and for B/W display.

#### 3-5-9. Horizontal Rate AGC and Clamp Pulse Generator

COLOR GAIN control, CONTRAST control and BRIGHTNESS control are stabilized by insertion of reference signal and using feedback circuit. Horizontal rate BLACK pulse (B.P), BLACK CLAMP pulse (B.CL.P) and WHITE CLAMP pulse (W. CL.P) are generated here.

#### 3-5-10. Vertical Rate AGC and Clamp Pulse Generator

In this model, BEAM CONTROL circuit is used for high stability in white balance.

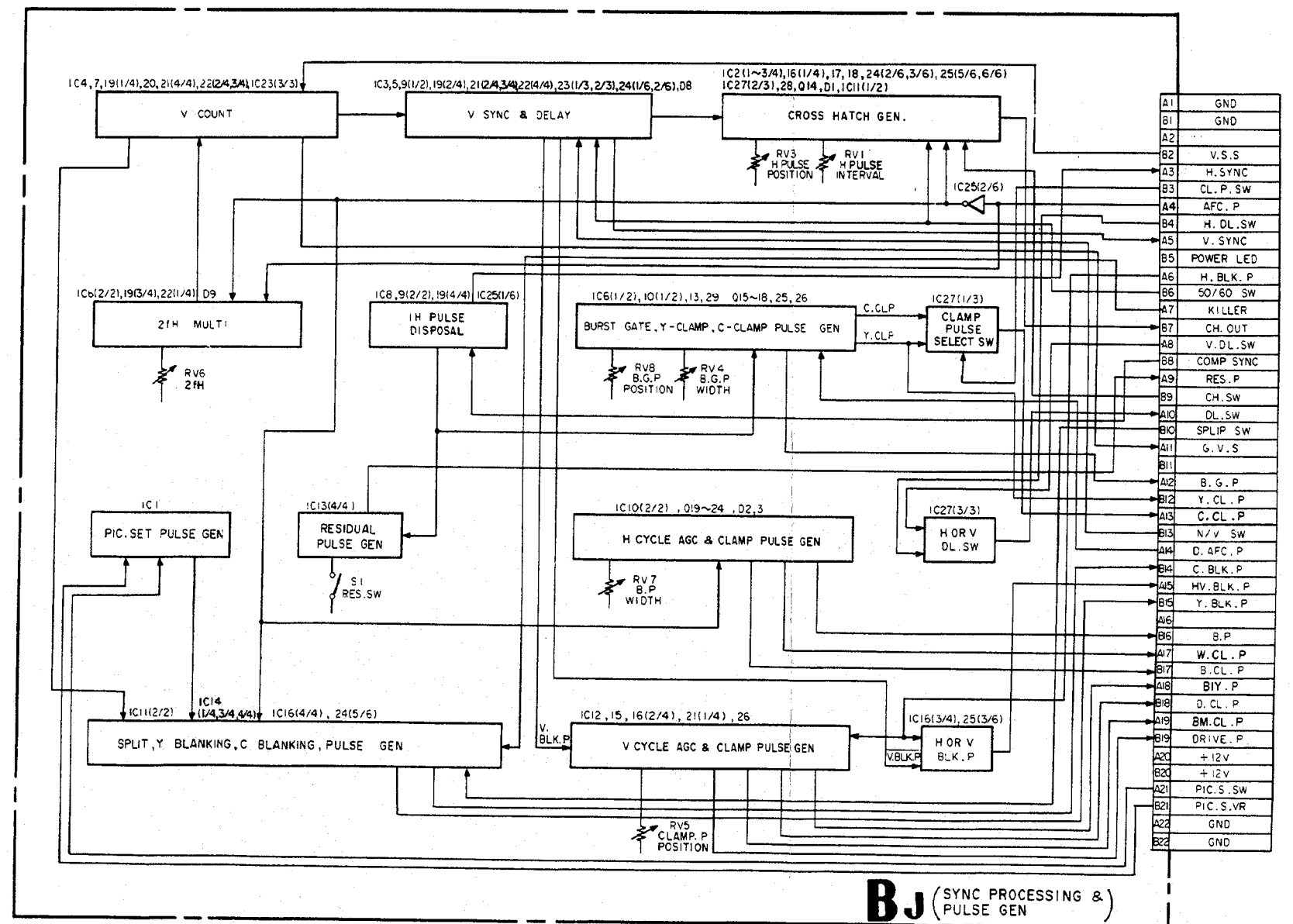
The reference signal is inserted in the signal for gain control circuit in video output amplifier and for beam control circuit. Vertical rate pulses are used for this purpose.

Vertical rate BEAM PULSE (BM.P) DRIVE PULSE (DRIVE.P) and BEAM CLAMP PULSE (BM.CL.P) are generated here.

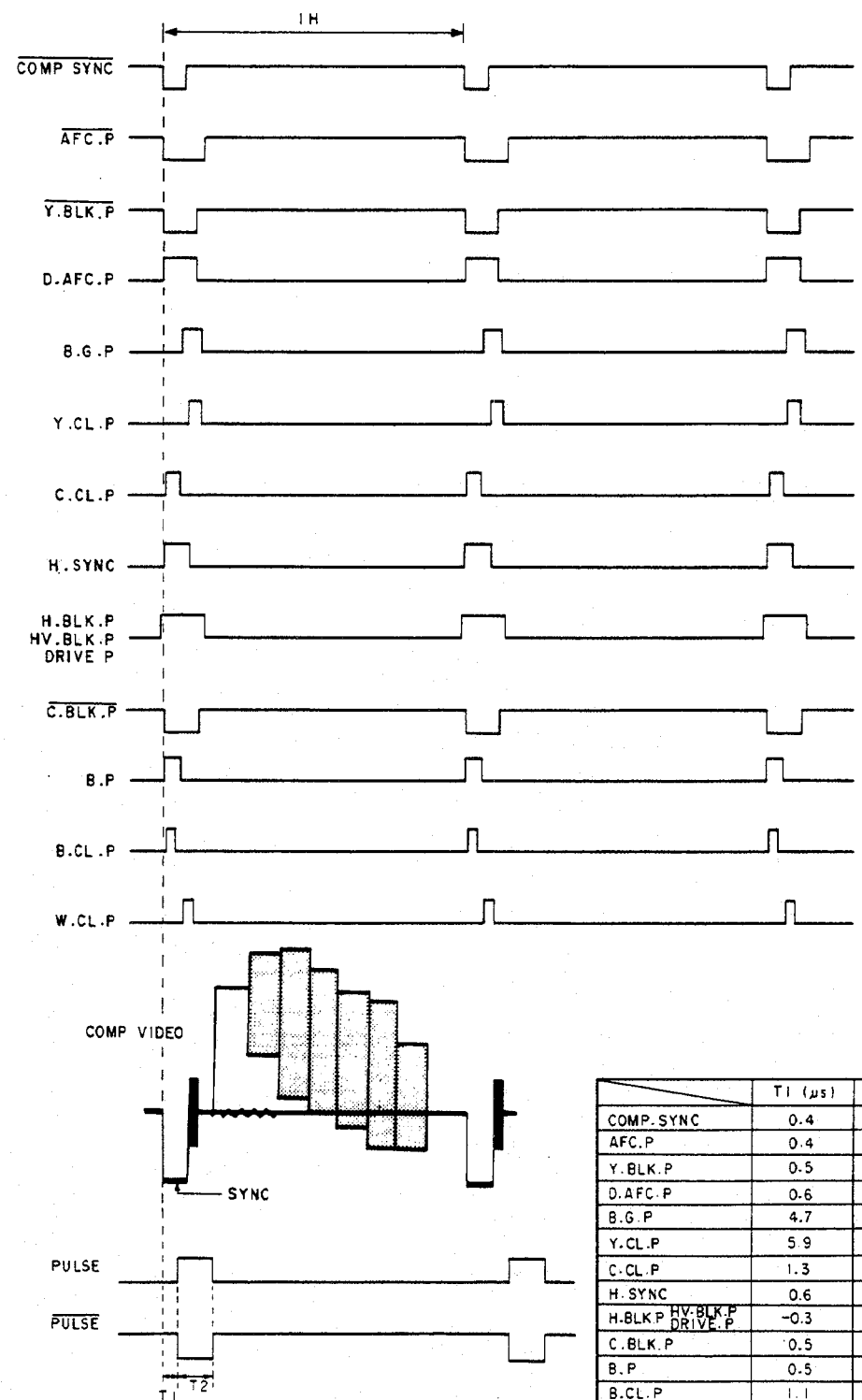
#### 3-5-11. Others

Black reference is determined at the position of clamping in black reference insertion circuit for both color difference signal and RGB signal. Accordingly C.CL.P is used as clamp pulse for color difference signal processing and Y.CL.P is for RGB signal. CLAMP PULSE SELECTION SW switches C.CL.P or Y.CL.P to the clamp pulse for the insertion of black reference.

BLOCK DIAGRAM OF BJ BOARD



# TIMING CHART OF MAJOR PULSE (BJ BOARD)



	T1 (μs)	T2 (μs)
COMP.SYNC	0.4	4.8
AFC.P	0.4	9.0
Y.BLK.P	0.5	7.2
D.AFC.P	0.6	7.2
B.G.P	4.7	4.1
Y.CL.P	5.9	2.6
C.CL.P	1.3	3.0
H.SYNC	0.6	5.5
H.BLK.P	-0.3	9.0
C.BLK.P	0.5	7.2
B.P	0.5	3.5
B.CL.P	1.1	1.8
W.CL.P	4.4	1.8

Figure 7

# FIELD 1 VERTICAL BLANKING

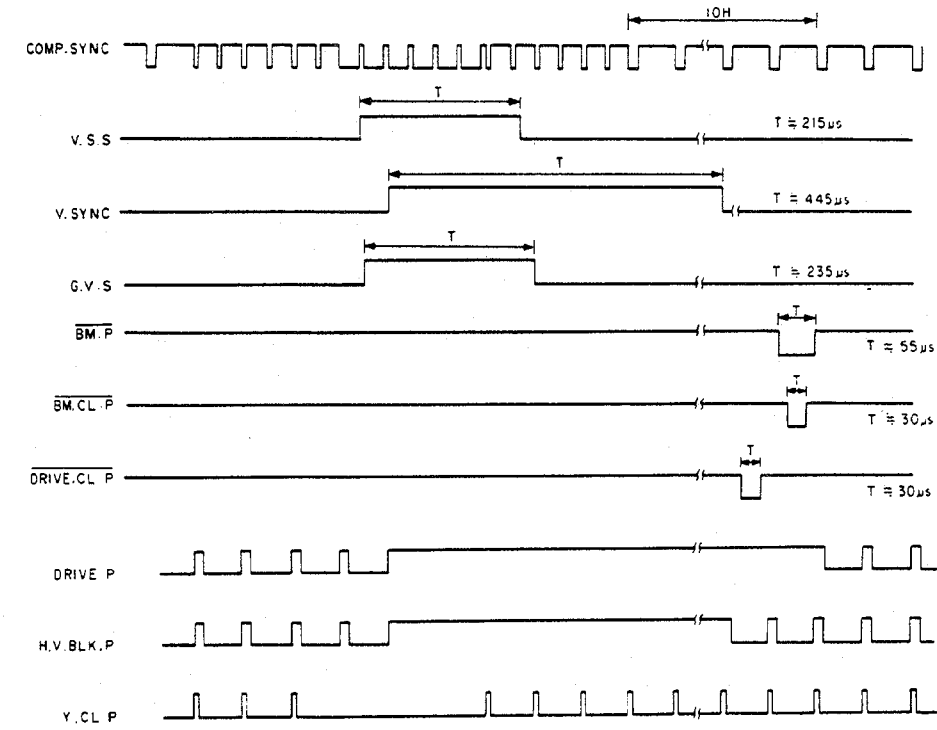


Figure 8

# FIELD 2 VERTICAL BLANKING

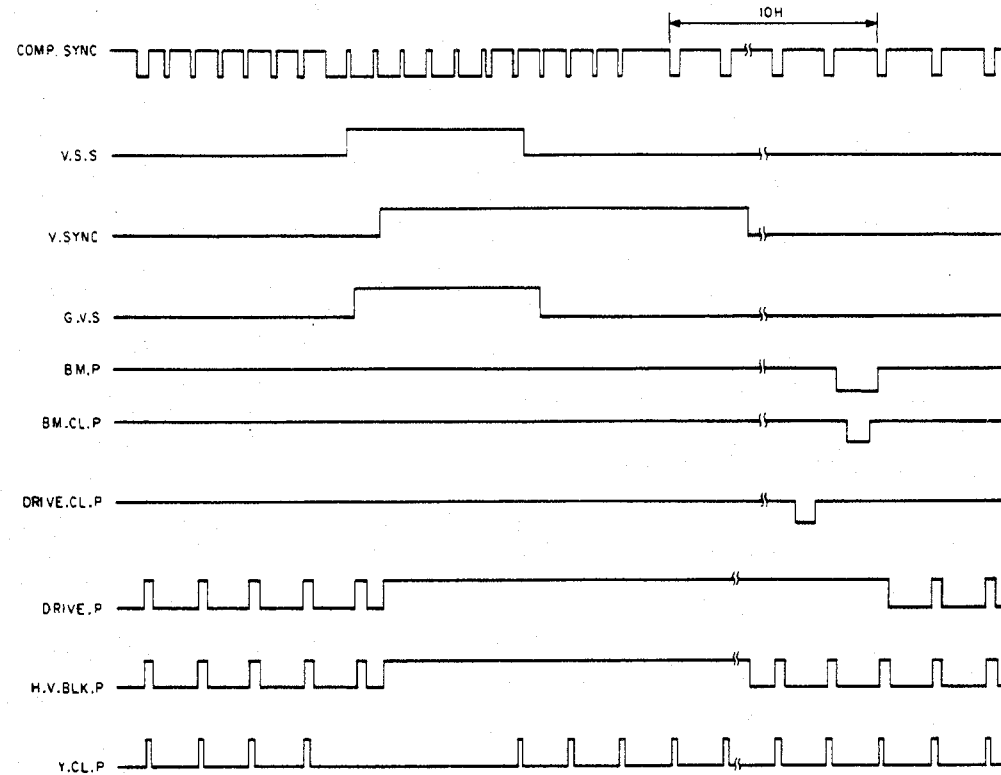


Figure 9

3-6. BK BOARD

Following are described about Red channel. Green and Blue channel are the Same.

3-6-1. Red Drive Amplifier, Red Buffer

This circuit drives final stage of video output amplifier. Gain is approx. 2

3-6-2. Red Video Output Amplifier and Buffer

This is the final stage amplifier to obtain amplitude enough to drive cathode of CRT.

Gain is approx. 11

The amplified signal is input to the RED cathode of CRT through the next stage's buffer. At this final stage's buffer, the current source (Q107) is applied.

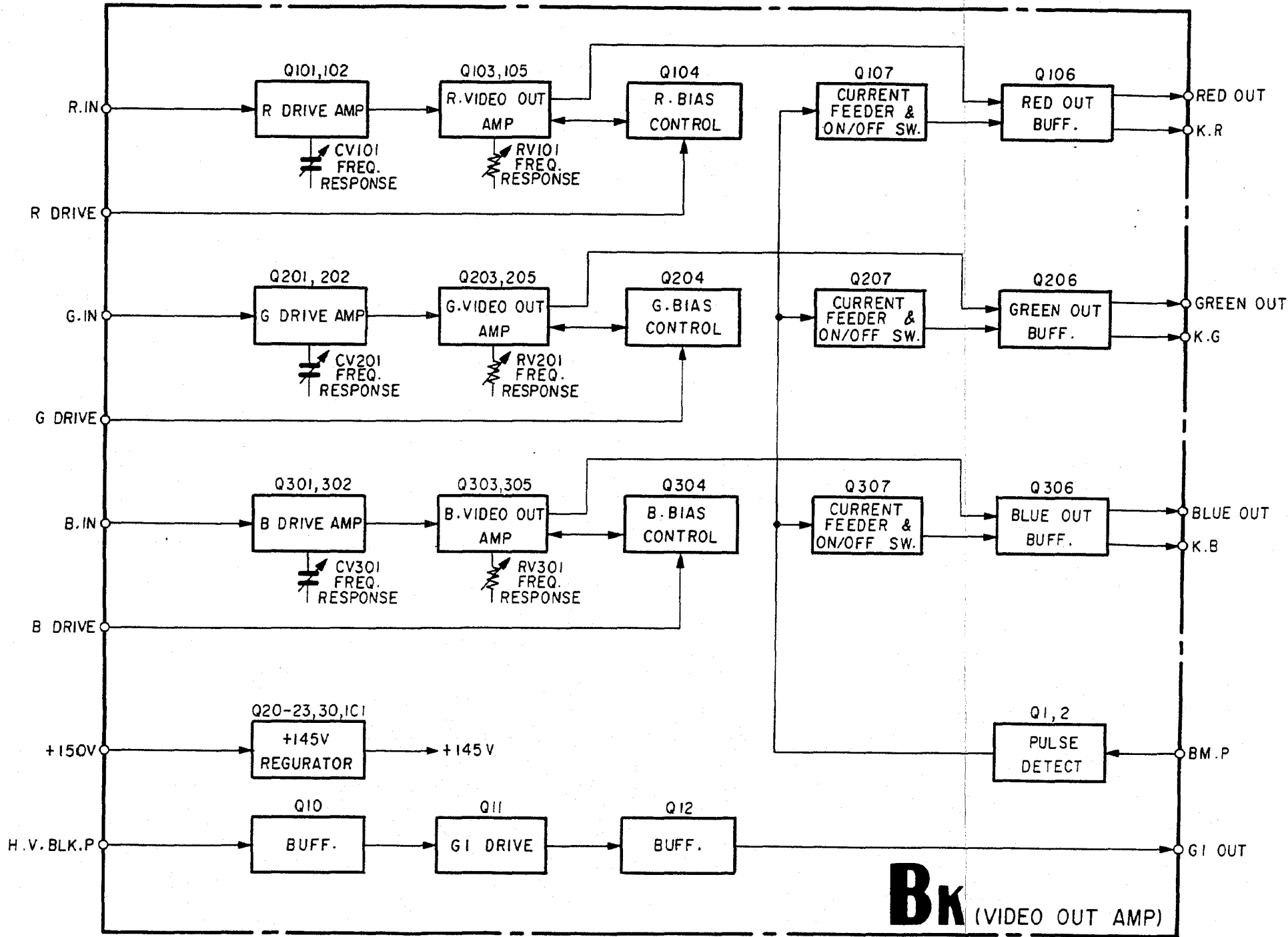
A B.M.P signal of positive polarity is input to the base of Q107. For this B.M.P period, Q107 is cut off, and the current is consequently not supplied to the buffer. So, the only current supplied from cathode is flown from emitter to collector of Q106 in this period.

This board outputs the Q106 collector current as K.R.

3-6-3. H.V. Blanking Circuit

H.V.BLK. pulse is amplified by G1 drive circuit and it is fed to the G1 of CRT through the buffer.

BLOCK DIAGRAM OF BK BOARD



**3-7. Beam control Circuit (BI, BK BOARD)  
(Same as Green and Blue)**

Block diagram is shown in Figure 10.

### 3-7-1. Detection of Cathode Current and I-V Conversion (BI BOARD)

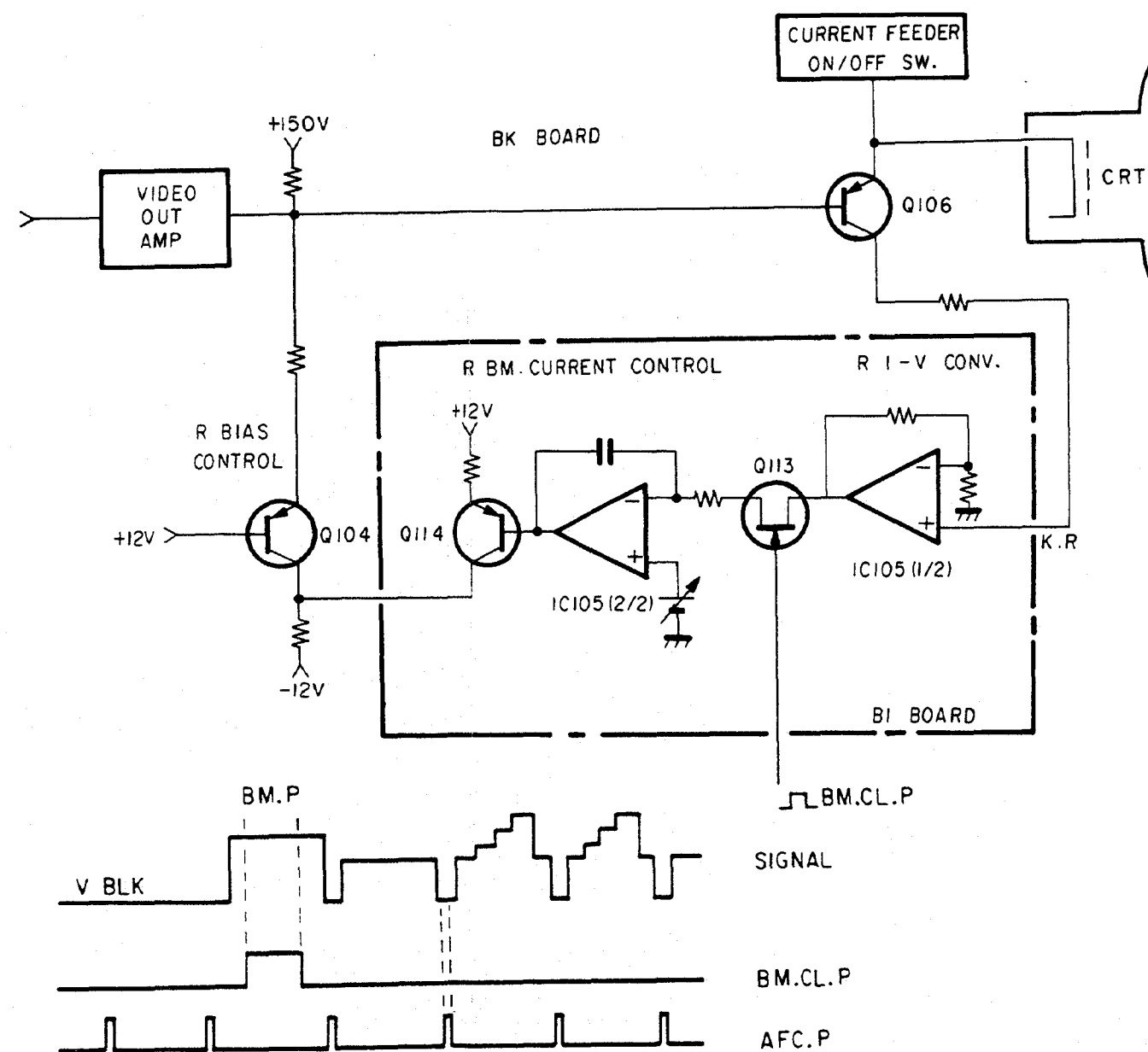
Cathode current is detected as a voltage by using IC105 (1/2)

### 3-7-2. Red BM. CURRENT Control (BI BOARD)

BMP is inserted in the signal during vertical blanking in BI board. This BMP is detected as a cathode current and sampled by BM CLP applied to FET Q113. This BM. CURRENT control circuit controls the base voltage of transistor Q114 so that converted voltage from cathode current and the reference voltage may match.

### 3-7-3. Red Bias Control Circuit (BK BOARD)

In the R BIAS control circuit on the BK board, emitter current of Q104 is controlled according to the variation of Q114 base voltage on the BI board.  
Therefore, the base voltage of Q106 changes so that the black level of signal that is input to the cathode of CRT is controlled.



*Figure 10*

(BVM-1316 ONLY)

3-8. NTSC COMB FILTER (BT BOARD)

3-8-1. 3 Line Dynamic Comb Filter (Fig. A)

The fed video signal is band limited by a low-pass filter. (This signal is hereinafter referred to as the OH signal.) The OH signal becomes the signal which is 1H (63.556  $\mu$ sec) delayed by the 1H delay circuit (1H delayed signal) and the signal which is 1H further delayed by the 1H delay circuit (2H delayed signal). The OH, 1H, and 2H signals are band limited by the respective band-pass filters (center frequency: fs) for delay of  $\lambda/2$  (140 nsec). The 1H signal is further  $\lambda/2$  delayed. The OH+ $\lambda/2$ , 1H, 1H+ $\lambda/2$ , 1H+ $\lambda$  and 2H+ $\lambda/2$  (A, B, C, D and E of the block diagram) at each point are separated into chroma signals only by the correlation circuit (IC501). The luminance signal is separated with the chroma signal subtracted from the 1H signal.

3-8-2. 2 Line Simple Comb Filter

The chroma signal is separated with the OH+ $\lambda/2$  and 1H+ $\lambda/2$  signal subtracted, and the luminance signal is separated by subtracting the chroma signal from the OH signal.

3-8-3. 1H Delay Circuit (Fig. B)

The 1H delay circuit consists of two CCD delay lines. These CCD delay lines are used in parallel to attain 1H (63.556  $\mu$ sec) signal delay.

3-8-4. Band-pass Filter (Fig. C)

The band-pass filter consists of a delay line. It performs band limiting with the group delay kept constant.

3-8-5. Correlation Circuit (IC501) (Fig. D)

The correlation circuit consists of a limiter circuit which is common to emitters to perform separation of a chroma signal.

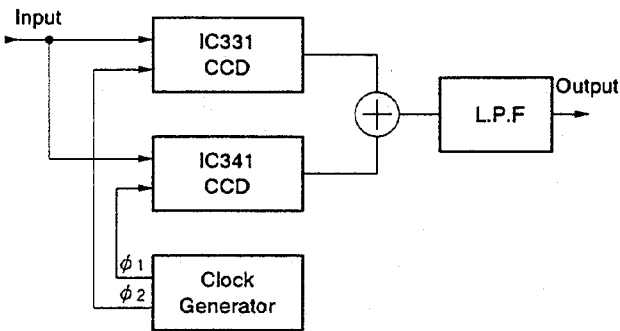


Figure B

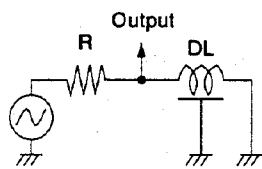


Figure C

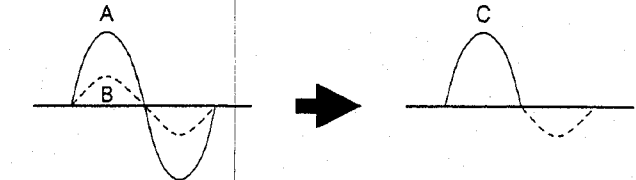
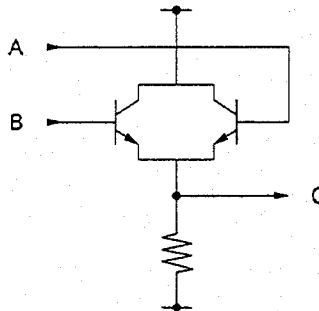


Figure D

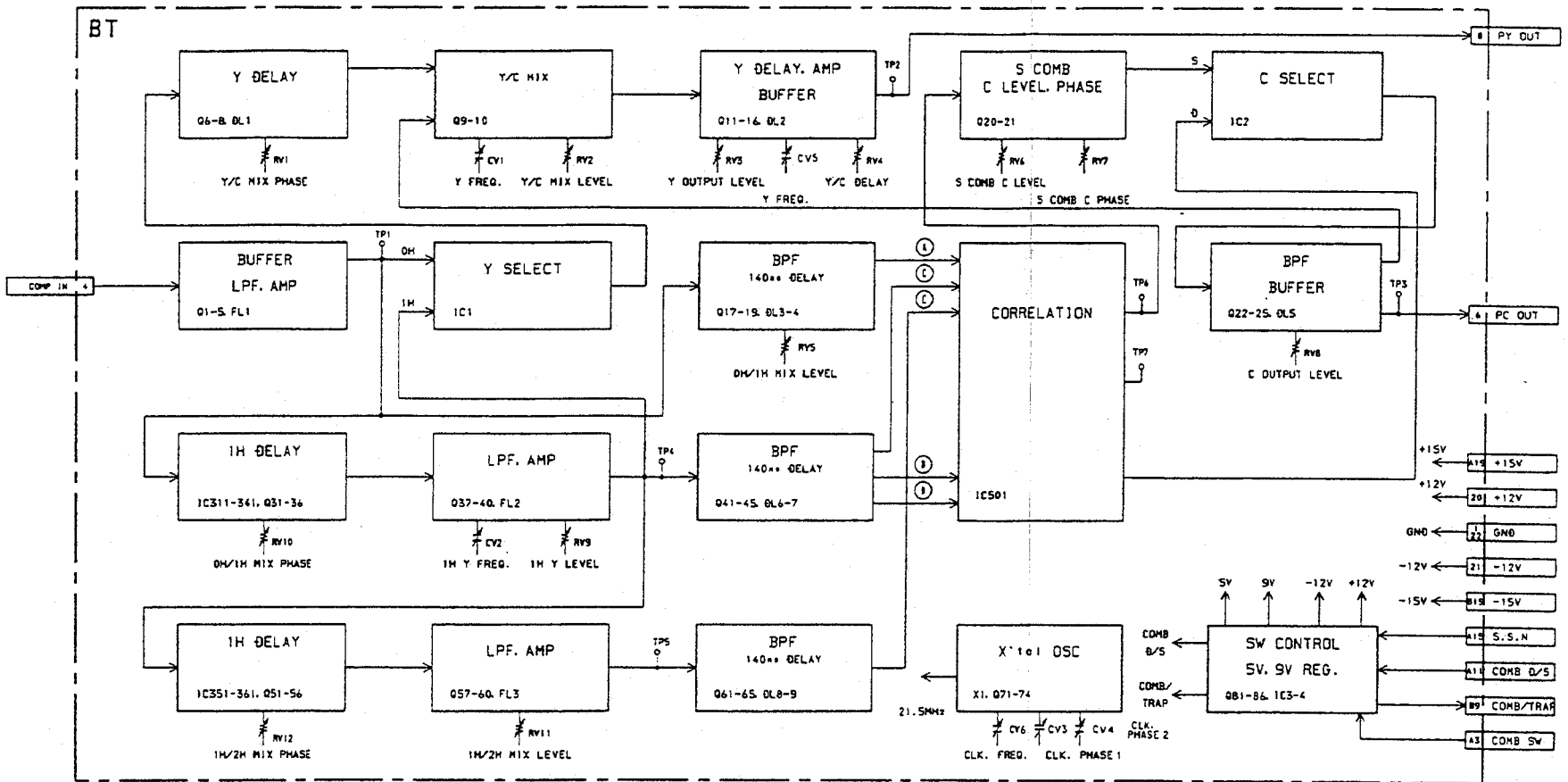


Figure A

(BVM-1316 ONLY)

3-9. NTSC DEMODULATOR, Y TRAP CIRCUIT  
(BC BOARD)

The composite video signal (NTSC) supplied from BA board is fed to transistor Q1 (buffer), then is supplied to the 3.58MHz trap circuit with Y signal and to band pass filter with chrominance signal.

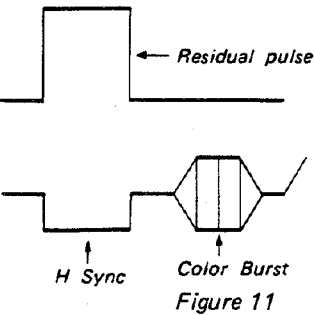
3-9-1. Chroma Band Pass Filter

The composite video signal obtained from at the emitter of transistor Q1 is fed to the Band pass filter composed of resistor R18, capacitor C7, C8, inductor L3 and transistor Q5. The center frequency of this filter is adjusted to the subcarrier frequency (3.58MHz) by L3, and chrominance signal is derived from Q5.

This circuit selects comb filter (BB board) mode or notch filter mode by a push of button on the front panel. When comb filter mode is selected, comb switch circuit composed of transistor Q103 and Q104 activates and base voltage of Q5 goes down to -12V and Q15 is cut off and then chrominance signal (Pure C) is provided from comb filter circuit to IC2.

3-9-2. Residual SW Circuit

The chrominance signal derived at transistor Q5 is fed to analog switcher IC2. When switch S1 on BJ board is set to ON position, residual pulse which has almost same phase as H sync is fed to control terminal of analog switcher (pin ③ of IC2) and screening is performed during H sync period. When switch S1 on BJ board is set to OFF position, Low level signal (0V DC) is fed to control terminal and screening action is not performed. Thus residual switch circuit does not activate. When there is residual subcarrier in the video signal, clamp level of color difference signal changes by turning switch S1 ON/OFF and therefore residual subcarrier can be checked on the picture as a color shift.



3-9-3. Chroma Amplifier Circuit

The level of chrominance signal from residual switch circuit (IC2 pin ④) is divided by resistor R85 and R86 and is fed to chroma amplifier circuit (Q6, Q7, Q8). The gain of this amplifier is almost 1 and this amplifier has 2 outputs. They are non-inverted signal and inverted signal. Non-inverted signal is fed to R-Y input terminal (IC1 pin ③) of demodulator and inverted signal to B-Y input terminal (IC1 pin ②).

3-9-4. Phase Control Circuit

The chrominance signal from residual switch is also fed to phase control circuit (Q9, Q10, Q11, Q12, D12). In this circuit, a variable capacitance diode (D2) is used to control the phase of color burst signal. Anode voltage of D2 is applied by variable resistor RV2 and preset adjustment of phase is made by this variable resistor.

When the PHASE control on the right side of the front panel is turned, DC level of phase control signal (board terminal A13) changes and this phase control signal is fed to the cathode of D2 via analog switcher (IC3). In this way, Burst phase of chrominance signal is controlled according to the DC level of the phase control signal.

Analog switcher IC3 (2/3) activates to make short-circuit between input terminal pin ⑬ and output terminal pin ⑭, only when COLOR STANDARD SELECTOR in the right side of drawer is selected to NTSC and otherwise pin ⑬ kept open circuit. As above phase controlled chrominance signal is derived from emitter of transistor Q12 and burst signal in this signal is gated by IC (1/3). The gated burst signal is fed to the burst input terminal pin ⑪ of demodulator IC1.

3-9-5. NTSC Demodulator

Block diagram of IC used for NTSC demodulator is shown in Figure 12.

This IC is designed for use of NTSC demodulator.

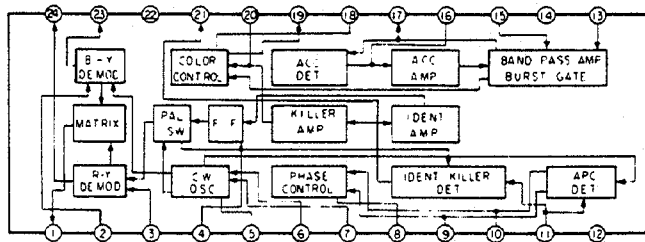
When chrominance signal is fed to pin ② and pin ③, color burst signal to pin ⑪ and Burst Gate Pulse (B.G.P.) to pin ⑬, R-Y and B-Y color difference signals are obtained at output terminals pin ②③ and pin ④⑤.

The demodulation axes of this demodulator are R-Y axis and B-Y axis. Variable capacitor CV1 is adjusted so that the phase angles between them are 90°.

Local oscillator (3.58 MHz) is formed by CW oscillator in IC1 connected to the terminal pin ⑤, ⑥, ⑦, ⑧ and external circuit. The variable capacitor CV2 is adjusted so that the free run frequency may be subcarrier frequency 3.579545MHz.

Also APC (Automatic Phase Control) circuit is formed by APC section in IC1 connected to the terminal pin ⑨ and ⑩ local oscillator is controlled by APC circuit.

The color difference signals demodulated by this IC are fed to low pass filter, where high frequency component is removed, then R-Y and B-Y color difference signals are obtained.



Block diagram of NTSC demodulator  
Figure 12

3-9-6. 3.58MHz Trap Circuit, Phase Compensation,  
Y Delay Correction Circuit

The composite video signal from emitter of transistor Q1 is fed to 3.58MHz trap circuit composed of resistor R5, R6, R7, capacitor C1 and inductor L1.

Adjustment of L1 is made so that the resonance frequency of this trap circuit should be subcarrier frequency.

Y (Luminance) signal removed subcarrier is obtained at output terminal of the trap circuit and is fed to the phase compensation circuit. (Transistor Q2, resistor R8, R9 R10, inductor L2 capacitor C4)

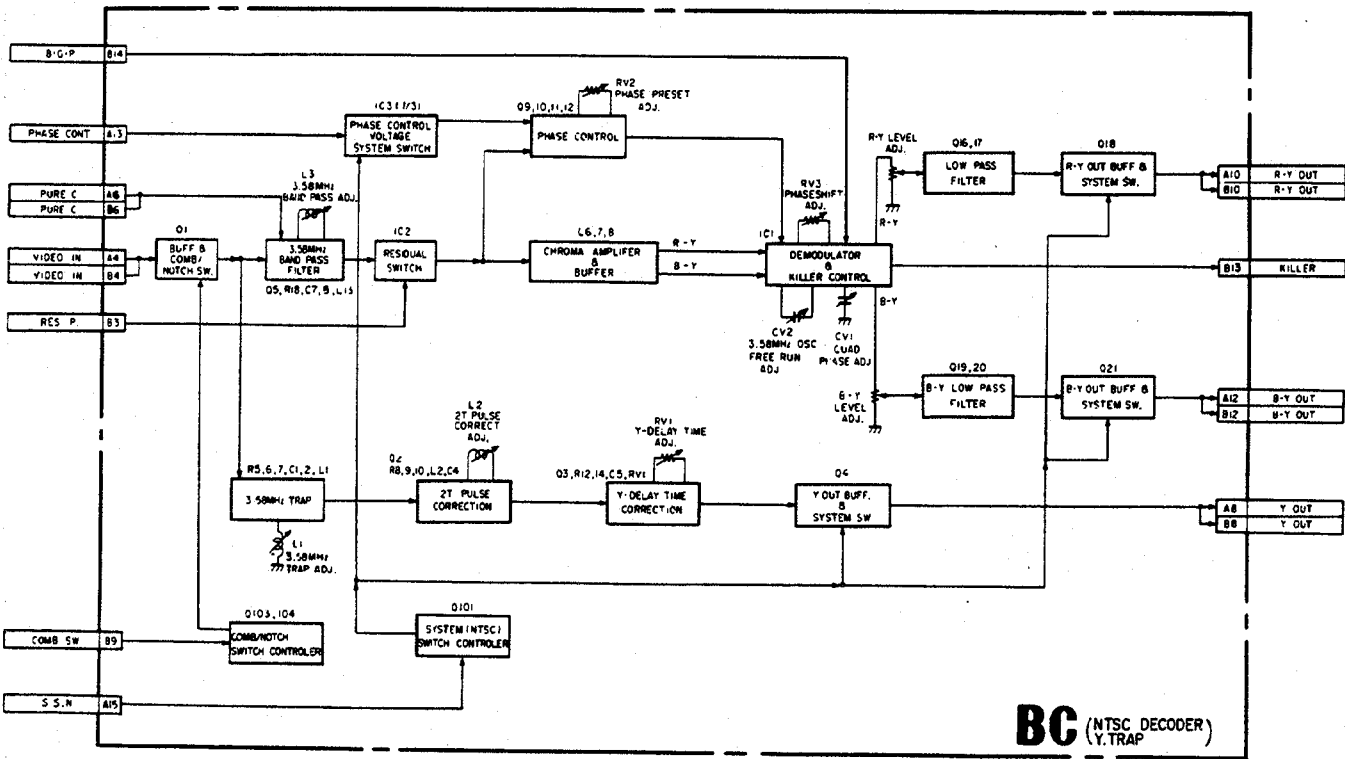
This circuit compensates phase delay of the signal at high frequency due to the trap circuit.

Y signal compensated phase delay is fed to Y-delay circuit. In this circuit Luminance/Chrominance time error is compensated by delay line.

3-9-7. Color Standard Selector

When NTSC system is not selected by the COLOR STANDARD SELECTOR in the right side drawer, transistor Q101 is cut off and +12V line power source is not supplied to the demodulator circuit.

BLOCK DIAGRAM OF BC BOARD



BC (NTSC DECODER)  
Y-TRAP

(BVM-1416P ONLY)

### 3-10. PAL DEMODULATOR, Y TRAP CIRCUIT (BD BOARD)

The composite video signal (PAL) supplied from BA board is fed to transistor Q1 (buffer), then is supplied to the 4.43 MHz trap circuit with Y signal and to band pass filter with chrominance signal.

#### 3-10-1. Chroma Band Pass Filter

The composite video signal obtained from at the emitter of transistor Q1 is fed to the Band pass filter composed of resistor R12, capacitor C7, C8, inductor L3 and transistor Q5.

The center frequency of this filter is adjusted to the subcarrier frequency (4.43 MHz) by L3, and chrominance signal is derived from Q5.

#### 3-10-2. Residual SW Circuit

The chrominance signal derived at transistor Q5 is fed to analog switcher IC2.

When switch S1 on BJ board is set to ON position, residual pulse which has almost same phase as H sync is fed to control terminal of analog switcher (pin ③ of IC2) and screening is performed during H sync period.

When switch S1 on BJ board is set to OFF position, Low level signal (0V DC) is fed to control terminal and screening action is not performed. Thus residual switch circuit does not activate.

When there is residual subcarrier in the video signal, clamp level of color difference signal changes by turning switch S1 ON/OFF and therefore residual subcarrier can be checked on the picture as a color shift.

#### 3-10-3. Chroma Amplifier Circuit

The chrominance signal from residual switch circuit (IC2 pin ④) is fed to chroma amplifier circuit (Q19, Q36).

After the chroma signal is amplified by the inversion amplifier (gain: 1X), it is voltage divided by resistors R400 and R314 and then input to the R-Y input terminal (IC1, pin ③) and B-Y input terminal (IC1, pin ②) of the following demodulator circuit via the buffer (Q38).

#### 3-10-4. Phasa Control Circuit

The chrominance signal from residual switch is also fed to phase control circuit (Q6, Q7, Q8, Q9, D12).

In this circuit, a variable capacitance diode (D10) is used to control the phase of color burst signal.

Anode voltage of D10 is applied by variable resistor RV8 and preset adjustment of phase is made by this variable resistor.

When the PHASE control on the right side of the front panel is turned, DC level of phase control signal (board terminal A13) changes and this phase control signal is fed to the cathode of D10 via analog switcher (IC5). In this way, Burst phase of chrominance signal is controlled according to the DC level of the phase control signal.

When PAL-D is selected with the PAL switch inside the right side drawer, between pins ③ and ④ of IC5 becomes conductive and phase control becomes dependent on RV7, disabling the Phase Control of the right side front panel.

Analog switcher IC5 (1/3) activates to make short-circuit between input terminal pin ③ or ⑤ and output terminal pin ④, only when COLOR STANDARD SELECTOR in the right side of drawer is selected to PAL and otherwise pin ③ kept open circuit.

As above phase controlled chrominance signal is derived from collector of transistor Q9 and burst signal in this signal is gated by IC6. The gated burst signal is fed to the burst input terminal pin ⑪ of demodulator IC1.

#### 3-10-5. PAL Demodulator

Block diagram of IC used for PAL demodulator is shown in Figure 11. This IC is designed for use of NTSC demodulator.

When chrominance signal is fed to pin ② and pin ③, color burst signal to pin ⑪ and Burst Gate Pulse (B.G.P.) to pin ⑬, R-Y and B-Y color difference signals are obtained at output terminals pin ⑬ and pin ⑭.

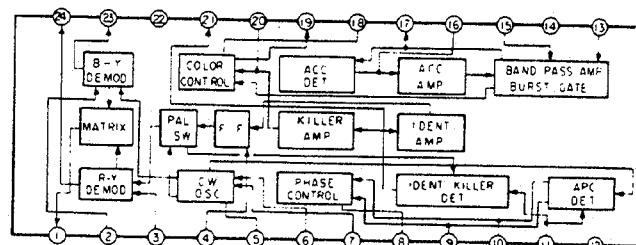
The demodulation axes of this demodulator are R-Y axis and B-Y axis. Variable capacitor CV1 is adjusted so that the phase angles between them are 90°.

Local oscillator (4.43 MHz) is formed by CW oscillator in IC1 connected to the terminal pin ⑤, ⑥, ⑦, ⑧ and external circuit.

The variable capacitor CV2 is adjusted so that the free run frequency may be subcarrier frequency 4.433619 MHz.

Also APC (Automatic Phase Control) circuit is formed by APC section in IC1 connected to the terminal pin ⑨ and ⑩ local oscillator is controlled by APC circuit.

The color difference signals demodulated by this IC are fed to low pass filter, where high frequency component is removed, then R-Y and B-Y color difference signals are obtained.



Block diagram of PAL demodulator

Figure 13

#### 3-10-6. PAL-D Matrix and PAL S/D Switching Circuit

This circuit is further divided into circuits for the R-Y and B-Y signals, but the operation of both circuits is the same. So only the R-Y one will be explained.

R-Y signals input from the demodulator circuit are input to Q20 (BUFF) and Q21 (BUFF).

The signals input to Q21 are then input to pin ② of the analog switcher (IC5). When PAL S has been selected, between pins ③ and ⑤ becomes conductive and the signals are supplied to the following circuit via Q33 (BUFF).

The signals input to Q20 are formed by IC7 and Q18. Bias is controlled by a clamp circuit and is input to pin ⑮ of the 1H delay line (IC3). The DC level of the input is adjusted to the optimum value by using RV9.

IC3, driven by the 10.64 MHz clock signal generated by the clock generator circuit configured with XZ, Q34 and Q35, delays the input signal by 1H cycle and outputs it from pin ⑪.

The high frequency component of the signal thus output is removed by the low-pass filter configured with Q22 and Q23, after which the signal is input to the following PAL-D matrix circuit.

The PAL-D matrix circuit is configured with R100, R101 and Q24. The signal that was not delayed is input through R100 while the 1H delayed signal is input through R101 at a ratio of 1/2.

The PAL-D signal added to the base of Q24 is obtained from its emitter. The signal obtained from the Q24 emitter is input to pin ① of IC5. When PAL-D is selected, between pins ① and ⑤ becomes conductive and the signal is supplied to the following circuit via Q33 (BUFF).

#### 3-10-7. 4.43 MHz Trap Circuit, Phasa Compensation, Y Delay Conrection Circuit

The composite video signal from the emitter of transistor Q1 is fed to 4.43 MHz trap circuit composed of resistor R5, R6, R7, capacitor C1, C2 and inductor L1.

Adjustment of L1 is made so that the resonance frequency of this trap circuit should be subcarrier frequency.

Y (Luminance) signal removed subcarrier is obtained at output terminal of the trap circuit and is fed to the phase compensation circuit. (Transistor Q2, resistor R8, R9 R10, inductor L2 capacitor C4)

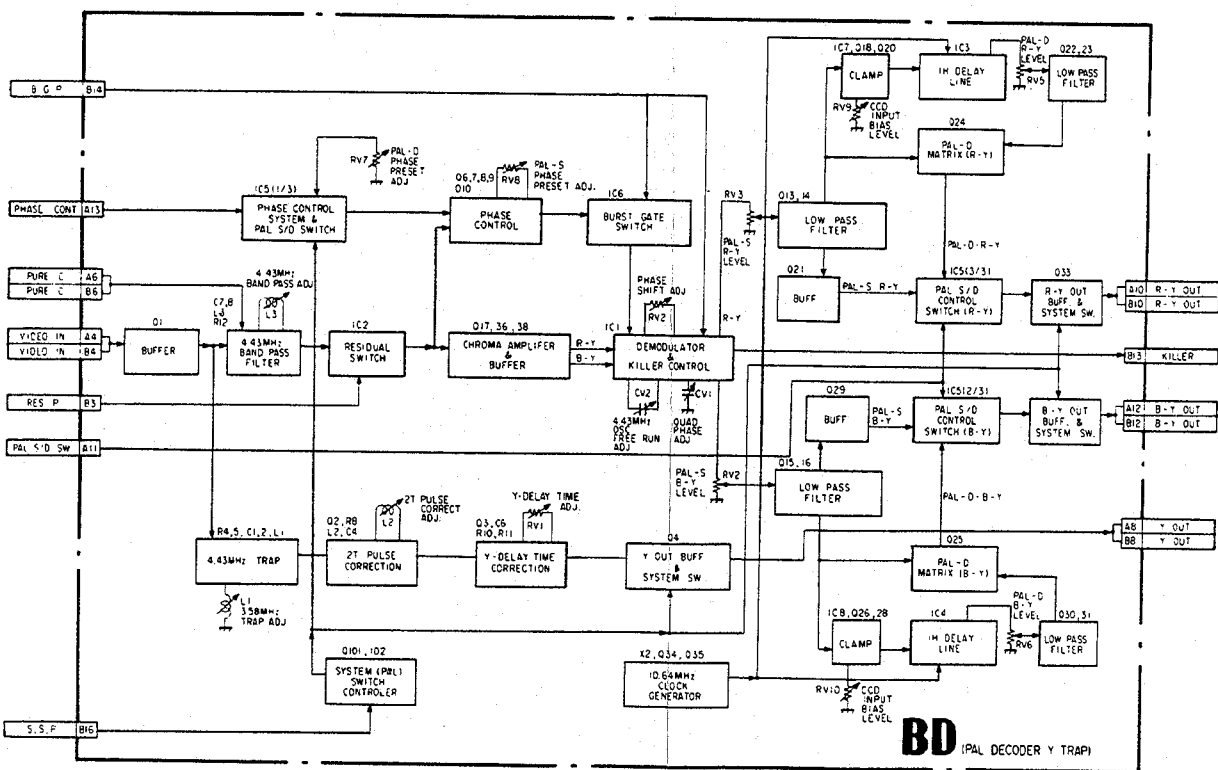
This circuit compensates phase delay of the signal at high frequency due to the trap circuit.

Y signal compensated phase delay is fed to Y-delay circuit. In this circuit Luminance/Chrominance time error is compensated by delay line.

#### 3-10-8. Color Standard Selector

When PAL system is not selected by the COLOR STANDARD SELECTOR in the right side drawer, transistor Q101, Q102 are cut off and ±12V line power source is not supplied to the demodulator circuit.

#### BLOCK DIAGRAM OF BD (PAL) BOARD



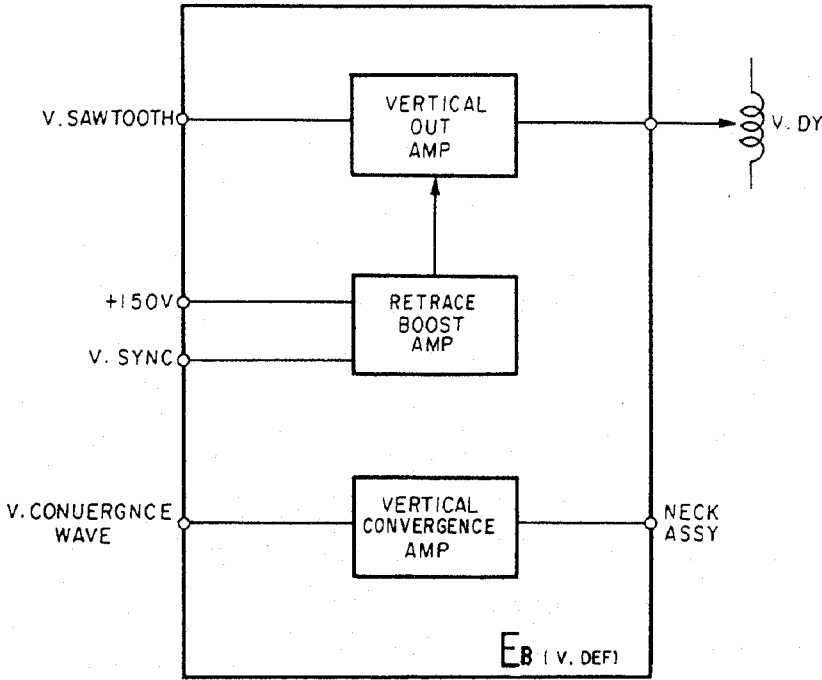


3-11. VERTICAL DEFLECTION OUTPUT CIRCUIT  
CONVERGENCE OUTPUT CIRCUIT  
(EB BOARD)

3-11-1. EB BOARD

**Vertical Deflection Output Circuit**  
The vertical deflection output circuit consists of the SEPP AMP, directly connected to DC power and composed of Q1 to Q5, and the retrace pulse voltage boost-up circuit, composed of Q7 and Q8.  
This SEPP AMP receives, as an input, the sawtooth wave voltage (added with the T&B pincushion compensating voltage and the vertical linearity compensating voltage) generated at the D board.  
Since the SEPP AMP is directly connected to the load (V.DY), the V.CENT circuit needs only DC current supplied to V sawtooth from  $\pm$  power supply.  
The boost-up circuit is turned on by the V.D signal and supplies energy to the output circuit during the vertical retrace period.

BLOCK DIAGRAM OF EB BOARD



### 3-12. POWER SUPPLY CIRCUIT (GA, GB BOARDS)

#### 3-12-1. AC Power Supply, Rectifier Circuit

Voltage selector located at the rear side of the unit should be selected to the local line voltage (AC 100/120V or 220/240V). In case of AC 100/120V selected by voltage selector, rectifier D21 capacitors C80 and C81 operate as a double multiple rectifier. See Figure 15(a). In case of AC 220/240V selected by voltage selector, rectifier D21 capacitors C80 and C81 operate as a full-wave rectifier. See Figure 15(b).

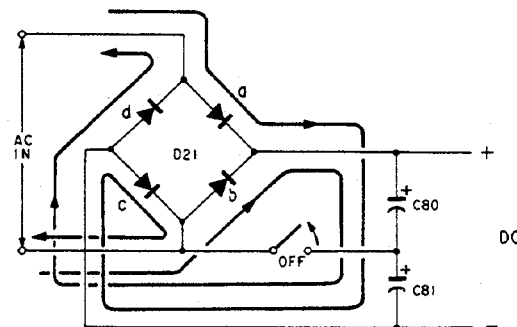
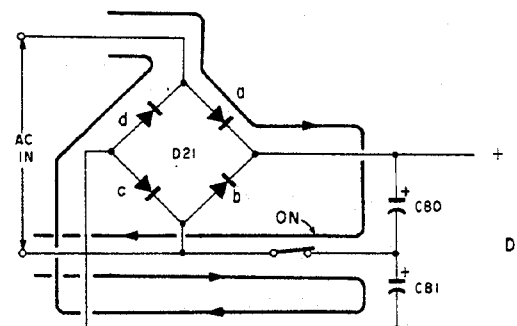


Figure 15(a)



AC IN Passes through D21d and charges to C81.

AC IN Passes through D21a and charges to C80.

Figure 15(b)

#### 3-12-2. Degauss Circuit

There are 2 posistors (PTH1, PTH2) in the degaussing circuit. One is used for AC 100/120V operation, the other is for AC 220/240V operation, these posistors are switched by voltage selector. This degaussing circuit is turned ON and OFF by using Relay (RY1) automatically. When power is turned ON, Automatic degaussing starts to work and a few seconds later stops automatically. Also Manual degaussing is available if necessary after a few minutes power is turned on when posistor (PTH1 or PTH2) gets cool down. This manual degaussing is operated by a push of button (Degauss Switch) at the left of the front panel. When degaussing circuit starts to work, Q11 transistor turns on by time constant circuit composed of resistors R88, 91 and capacitor C74. Q11 drives Q12 transistor. Relay (RY1) is driven by Q12. Time constant circuit keeps degaussing circuit to activate for several seconds until degaussing is finished.

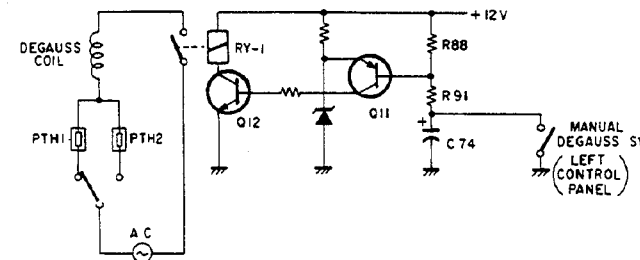


Figure 16

#### 3-12-3. Starter Circuit

Blocking oscillator composed of integrated circuit IC1 and transformer T4 operates when power is turned on. DC voltage obtained by diode D7 and capacitor C57 as a rectifier at the secondary circuit of T4 is supplied to IC2 and IC3, when AC voltage is higher than 50 ~ 70V (voltage selector at 100/120V position). Then power supply regulator starts to work and +15V line power supply is provided to IC2 and IC3 via diode D20, also voltage from T4 stops providing power supply to IC2 and IC3 because blocking oscillator is shut down by voltage generated at primary windings of SRT (Switching Regulator Transformer).

#### 3-12-4. Switching Regulator Circuit

Block diagram is shown in Figure 20. This is half bridge type of switching regulator in this model.

#### Following Description is the Theory of Half-Bridge Switching Regulator.

DC voltage  $E_{IN}$  rectified from AC voltage in AC power rectifier section is divided by capacitor C1 and C2. C1 and C2 have almost same value. Q1 (contains 2 transistors) operates as a switch driven by PWM modulated pulse via T2 (Drive Transformer). Switching current flows through primary windings of T1 (SRT) by switching transistor Q1 via T3 (Current Transformer). Thus output voltages are generated at secondary windings of T1.

#### Practical Circuit Used in this Model

There are 2 switching regulators in this power supply. One is for low voltage power supply,  $\pm 15V$ ,  $\pm 18V$  and  $+5V$ . The other is for high voltage  $\pm 150V$  power supply.

Low voltages are generated by IC2, T1, T2, T3 and Q1.

High voltages are generated by IC3, T6, T7 and Q2

Refer to block diagram

Current Transformer T3 and T7 detects excess current in transistor Q1 and Q2 for the protection of damage.

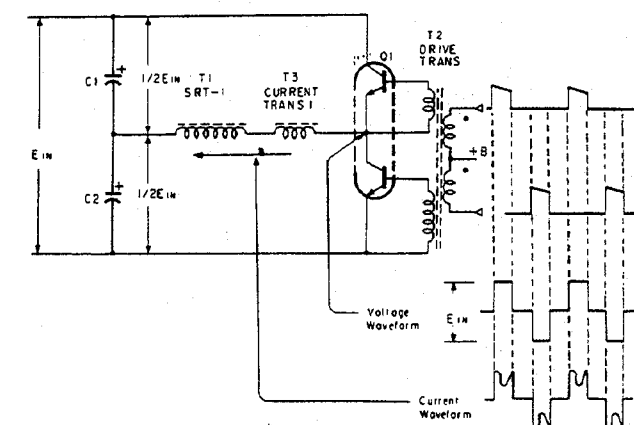
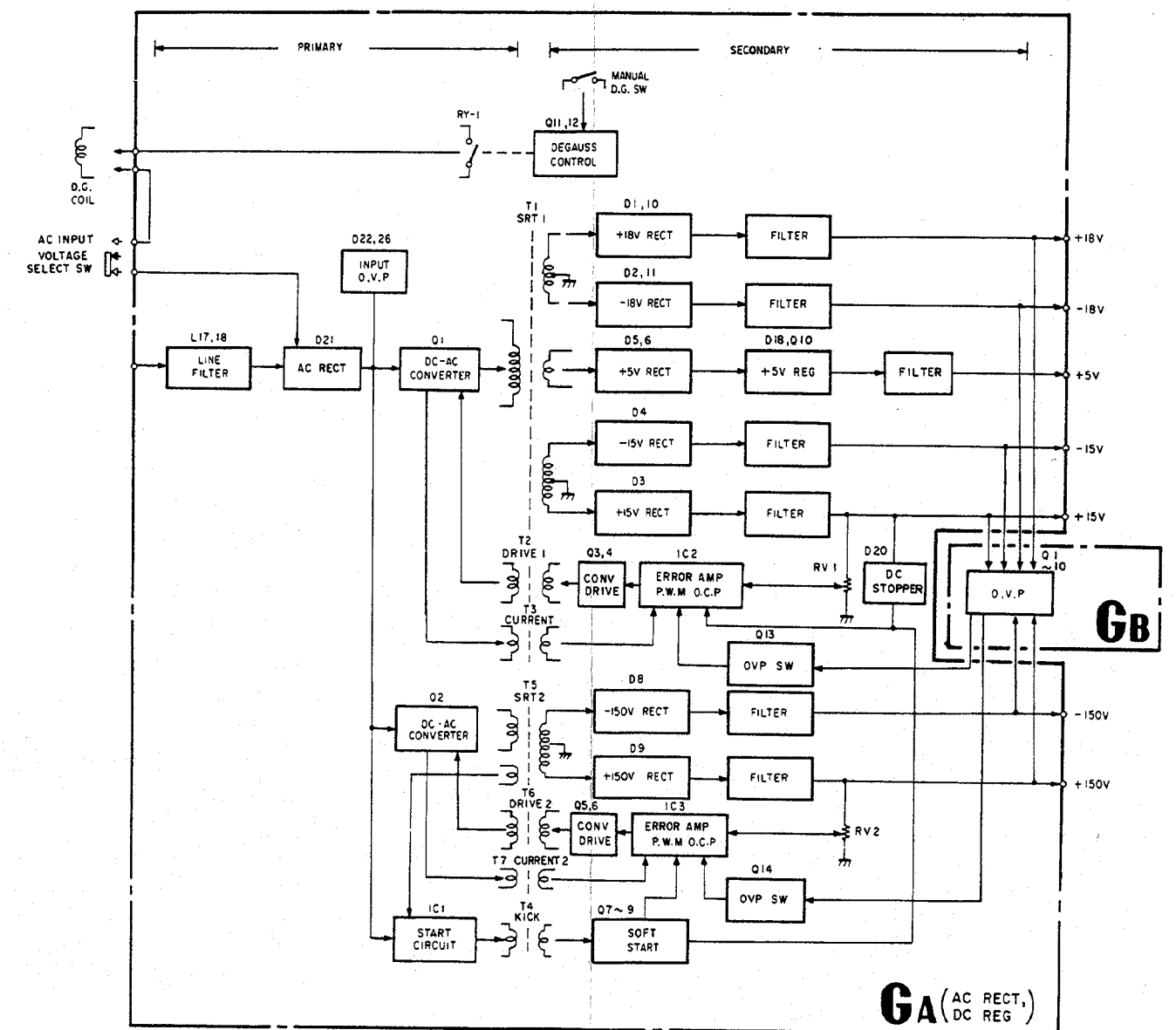


Figure 17

#### 3-12-5. Over Voltage Protector

Daughter board GB is mounted in mother board GA. GB board works for over voltage protection. When output voltage gets higher value than predetermined value, over voltage protector activates to prevent damage of unit.

### BLOCK DIAGRAM OF GA, GB BOARD



### 3-13. D BOARD

#### • Waveform Generation circuit (IC2, 7, 8, 9, 11, 18, 24, 25)

IC2 is a waveform generator. With the input of both horizontal and vertical sync signals, this IC generates the following signals:

- H rate saw tooth waveform signal (HS)
- H rate parabolic waveform signal (HP)
- V rate saw tooth waveform signal (VS)
- V rate parabolic waveform signal (VP)
- Modulated waveform signal
- H saw  $\times$  V saw (HS  $\times$  VS)
- H saw  $\times$  V parabola (HS  $\times$  VP)
- H parabola  $\times$  V saw (HP  $\times$  VS)
- H parabola  $\times$  V parabola (HP  $\times$  VP)
- H.SW PULSE, V.SW PULSE

H.SW and V.SW pulses are those which rise just in the middle of the trace period and fall in the retrace period.

#### • Scan Switching circuit (IC3, 4, 7, 24)

In the scan switching circuit, NORMAL, UNDER or SET-UP scanning is performed.

In H.SAW GEN. circuit, the H rate saw wave is output by the integrator of IC13 using the H.SW pulses from IC2 as reset pulses. The H rate saw thus generated is delayed about 1/2H as compared with that of the IC2.

#### • H.BLK.GEN., HV.DRIVE GEN. circuit (IC14, 15)

In the H.BLK.GEN. circuit, the H.BLK.P required for horizontal blanking is generated from the H.SAW waveform signal which is output signal of IC13. The HV.DRIVE GEN. is the same. In the H.Delay and H.PHASE circuits, like H.BLK.GEN., the D.AFC.P is output by comparing the H.SAW output signals of IC13. Further, this circuit performs H. PHASE and H.DELAY by not changing the pulse width of D.AFC.P but changing only the position.

#### • H.OSC, H.AFC circuits (IC18, 19, Q10)

IC19 is an IC which incorporates the H.OSC and H.AFC circuits. In this IC, the frequency and phase of H.OSC are controlled by comparing the phases of D.AFC.P and H.SYNC. This unit can vary the AFC time constant by the AFC.SW.

#### • SIN.GEN., COS.GEN. circuits (IC5, 6)

In the SIN.GEN. and COS.GEN. circuits, the SIN approximate wave is output by integrating the V rate parabola once and the COS approximate wave is output by integrating it twice.

#### • H.WIDTH circuit (IC3, 11)

In the H.WIDTH circuit, the correction waveforms such as SIDE PIN, SIDE PIN TILT, H.WIDTH, etc. are output by adding VP, VS, H. SIZE, etc. (H.WIDTH)

#### • H.LIN circuit (IC10)

In the H.LIN circuit, correction waveforms such as H.LIN.GAIN, H.LIN.BALANCE, etc. are output by adding HP, HS, etc. (H.LIN)

#### • V.SAW circuit (IC10)

In the V.SAW circuit, the correction waveforms such as V cycle saw wave, V.LIN. GAIN, V.LIN. BALANCE, V.GEN.TX BOW, TOP BOTTOM PIN, etc. are output by adding VS, DC, V.SIN, VP, HS, HS  $\times$  VS, etc. (V.SAW)

#### • H.CENT circuit (IC16)

In the H.CENT circuit, the correction waveforms of H CENT and Y BOW are output by adding VP and DC. (H.CENT)

#### • X.CONV circuit (IC8, 12, Q6)

In the X.CONV circuit, the correction waveform of vertical misconvergence is output by adding VP and DC which are generated separately in upper side and lower side of the picture screen.

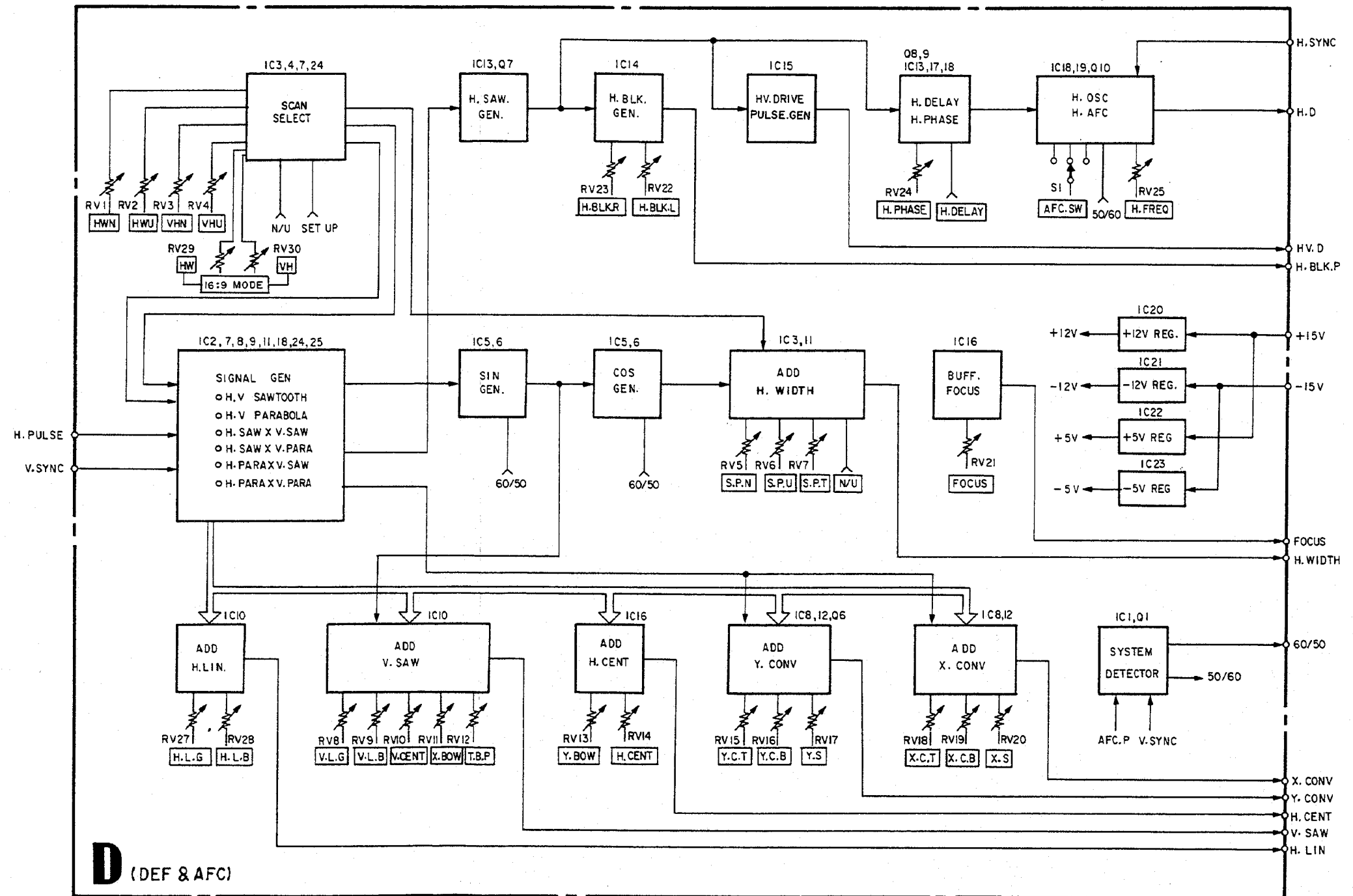
#### • Y.CONV circuit (IC8, 12)

In the Y.CONV circuit, the correction waveform of horizontal misconvergence is output by adding VP and DC which are generated separately in upper side and lower side of the picture screen.

#### • System Detector circuit (IC1, Q1)

With the input at both horizontal and vertical sync signals IC1 distinguishes between 525/60 and 625/50.

BLOCK DIAGRAM OF D BOARD



### 3-14. HORIZONTAL DEFLECTION OUTPUT CIRCUIT AND HIGH VOLTAGE REGULATOR CIRCUIT (EA BLOCK)

#### 3-14-1. Horizontal Deflection Output Circuit

The horizontal deflection output circuit controls H out of Q11, driving T2 at Q10 by the H drive pulse generated on the board D.

The power supply circuit to H out improves the power supply efficiency using -150V and DC-DC converter with IC1 and Q7. IC1 consists of the error amplifier and the P.W.M. circuit. IC1, being supplied with the side pin-cushion correction waveform and the H. width adjusting voltage from the board D, controls the DC-DC converter output.

#### 3-14-2. H. Center Adjusting Circuit

The H. center adjusting circuit, generating a  $\pm$  power source from the secondary output of T3 (H.O.T.), flows the correction current of the horizontal center position and Y bow bend to the horizontal deflection yoke.

#### 3-14-3. H. Linearity Correction Circuit

The H. LIN. circuit amplifies the H. LIN. correction waveform generated on the board D by the SEPP amplifiers of Q2 to Q5, and supplies these to the horizontal deflection yoke from the capacitor for S curve correction.

#### 3-14-4. High Voltage Regulator Circuit

The high voltage regulator of this unit uses the DC-DC converter type power supply circuit in order to reduce power consumption. In general, the movement of the high voltage regulator is as follows:

The high voltage regulator consists of Q16, Q18, IC3 (1/2), IC2 (IC for P.W.M. control) and HVR.

The detection voltage is obtained by directly dividing HV voltage with resistors in HVR.

IC2 compares this detection voltage with the reference voltage located outside IC2 (error amplification) and performs P.W.M. modulation. Q16 is driven by output of IC2 which is made PWM modulation and controls the voltage supplied to the FBT drive circuit (Q17, Q18, FBT).

The HV voltage is adjusted by changing the detection voltage. Since the detection voltage of HVR drops when the anode current is increasing and the high voltage drops, then the ON period of Q16 is widened.

As a result of this, as the peak current of the corrector current of Q18 increases, the energy which is stored in C68 via FBT is enlarged and the high voltage is regulated by increasing electric potential of C68.

When Q18 is turned off, a flyback pulse is generated by the synthesized resonance action by inductance of L.O.T. H.O.T. and the C65, C66, then, the HV voltage is generated by transferred the flyback pulse to the secondary side. (See Figure)

#### 3-14-5. High Voltage Protector

The detection voltage for the high voltage protector is obtained by directly dividing HV voltage with resistors in HVR.

For the high voltage protector circuit, when this detection voltage rises more than the reference voltage by the high voltage rise, output of the comparator IC4 (1/2) becomes high and the drive pulse of the high voltage converter is cut off by making D27 (SCR) gate on. Consequently, the high voltage output circuit is stopped.

Furthermore the threshold voltage for this protector is determined by not only the reference voltage obtained by zener diode but also the voltage obtained by ABL voltage (at 9 pin of FBT) in addition to the reference voltage.

#### 3-14-6. High Voltage Current Protector

The anode current is converted to the voltage by resistor R121 (EA board) in which the current flows in the secondary winding of FBT.

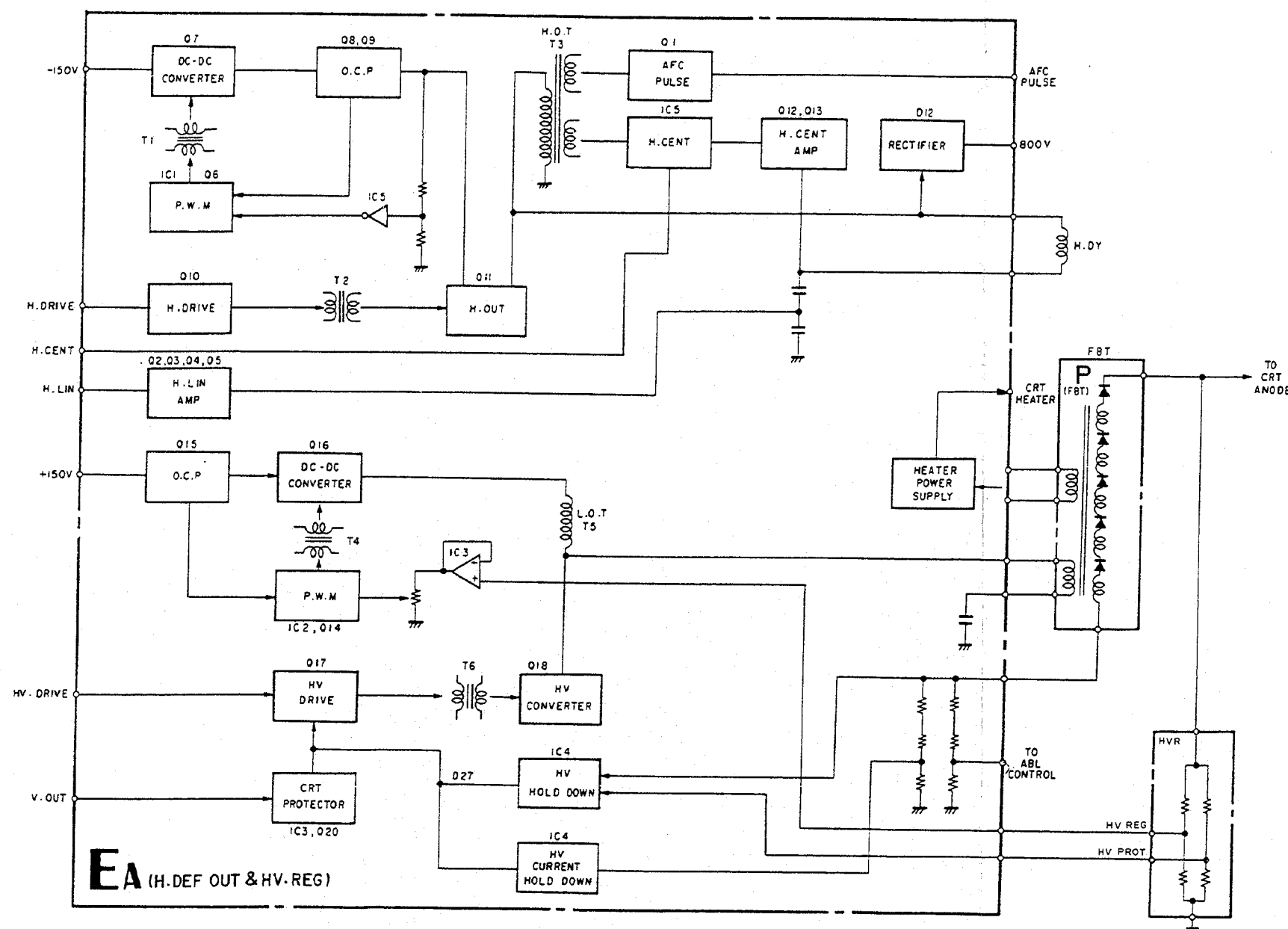
For the high voltage current protector, when the anode current increases extraordinarily, the output of comparator IC4 (2/2) becomes high and the drive pulse of the high voltage converter is cut off by making D27 (SCR) gate on. Consequently, the high voltage output circuit is stopped.

#### 3-14-7. CRT Protector

The CRT protector circuit is to prevent the CRT from burning when the vertical deflection circuit is stopped by some causes. For the CRT protector circuit, because the retrace pulse of V out disappears when the vertical deflection circuit is stopped, Q20 is turned off and the output of comparator IC3 (2/2) becomes high, then, with D27 (SCR) turned on to cut off the drive pulse of the high voltage converter circuit, the high voltage output circuit is stopped.

#### 3-14-8. CRT Heater Power Source

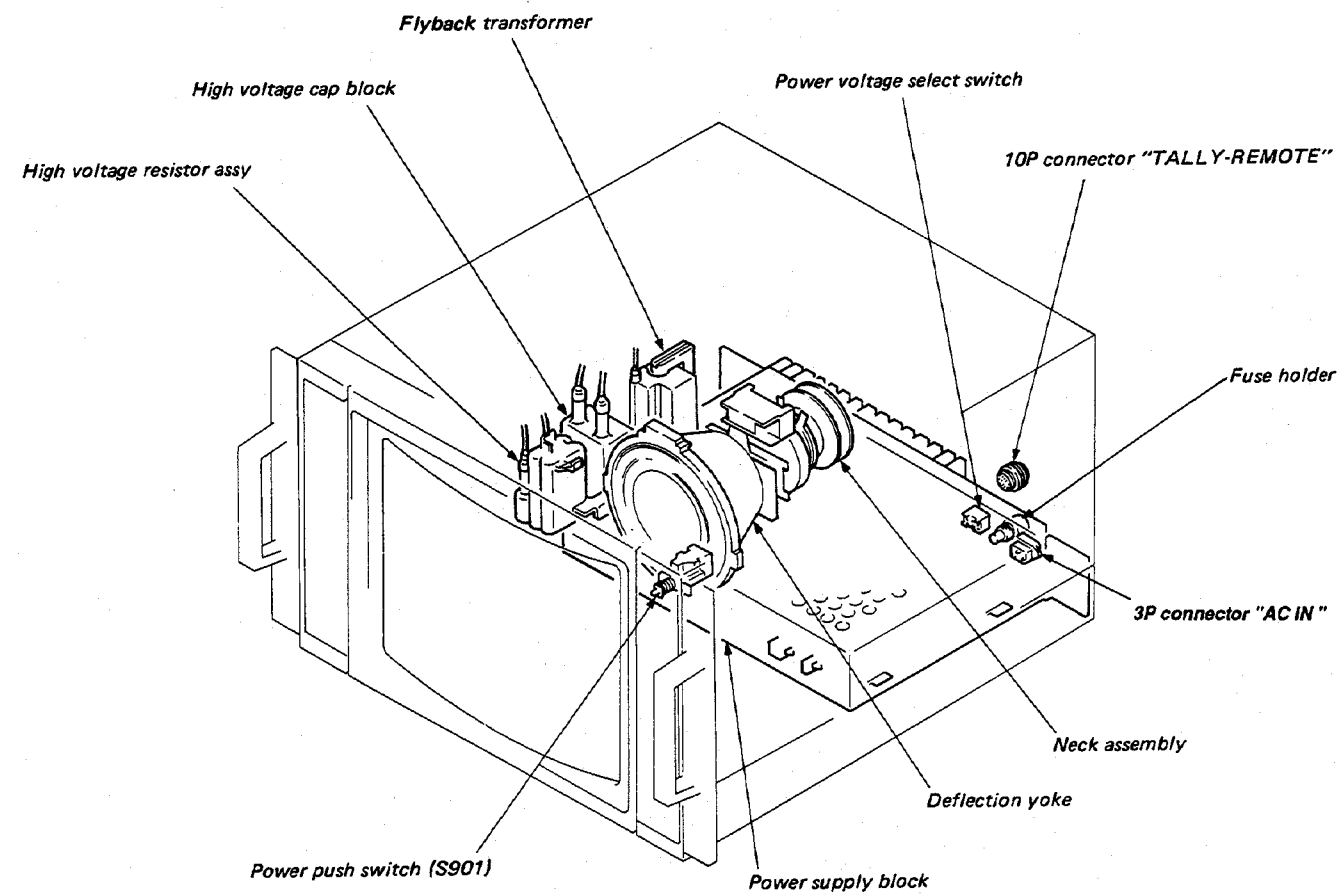
The CRT heater power source is supplied from the secondary winding of FBT.





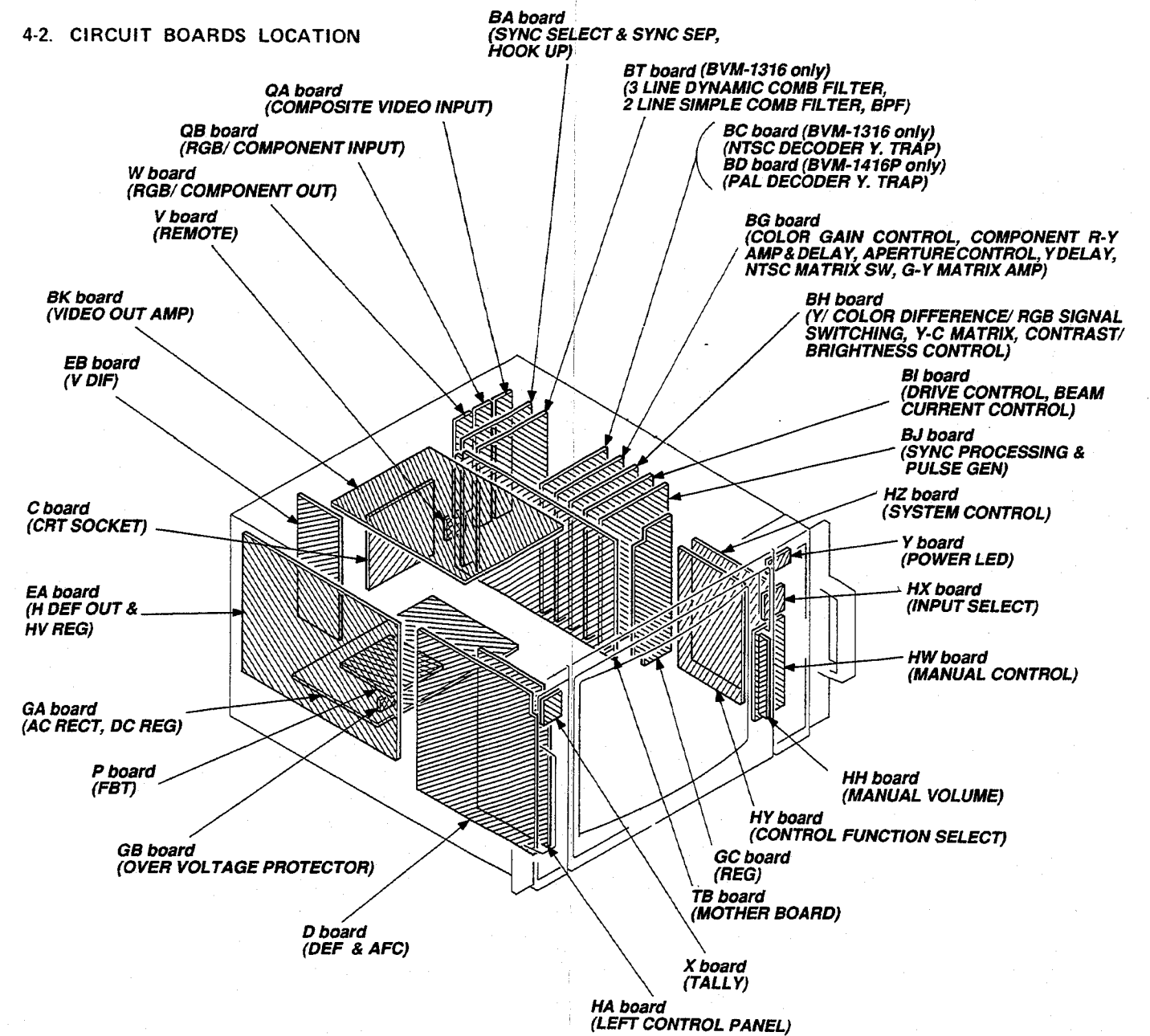
## SECTION 4 ADJUSTMENTS

### 4-1. INTERNAL VIEW



4-1

### 4-2. CIRCUIT BOARDS LOCATION

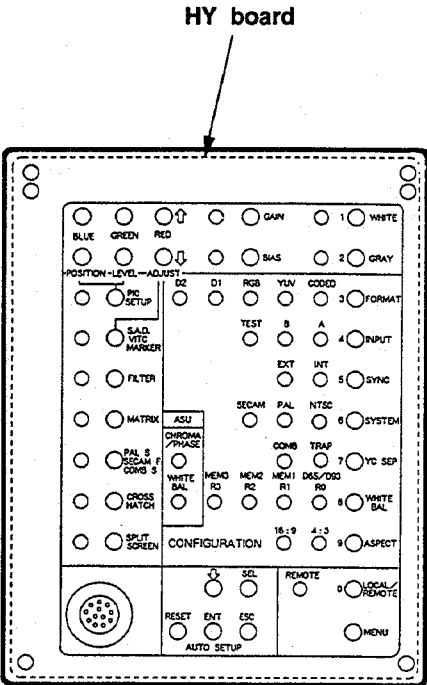
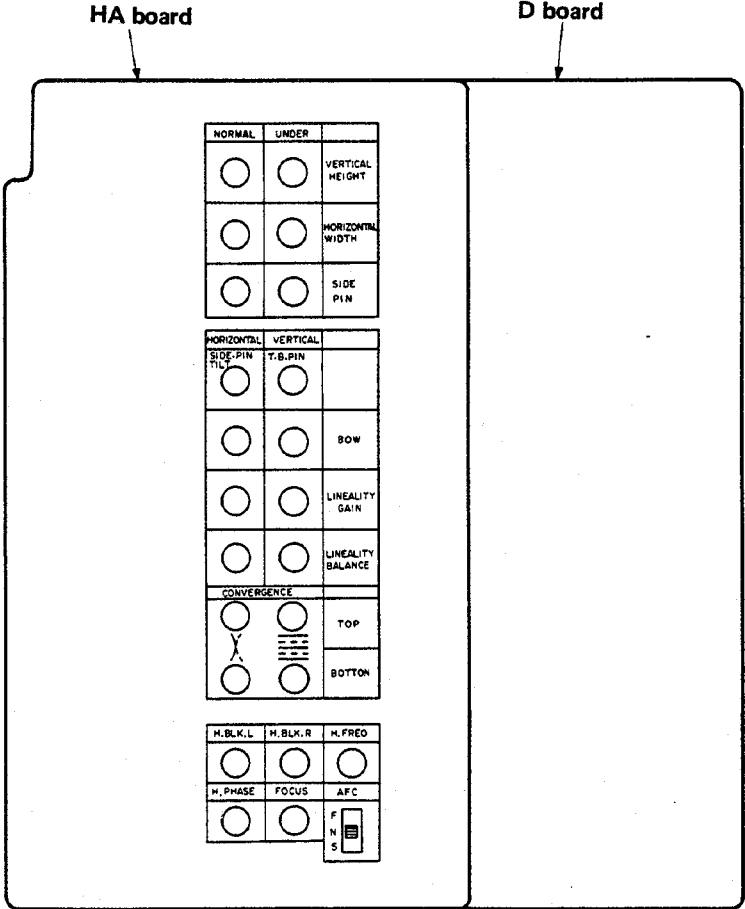


4-2

4-3. QUICK REFERENCE

BOARD SECTION	BA	BC	BD	BG	BH	BI	BJ	BK	BT	C	D
CIRCUIT DESCRIPTION	3-1	3-19	3-21	3-3	3-5	3-7 3-15	3-9	3-13 3-15	3-17	—	3-27
ADJUSTMENTS	4-21 4-25	4-31	4-61	4-21 4-27	4-21	—	4-30 4-44	4-45	4-47	—	4-76
BLOCK DIAGRAM	3-2	3-20	3-22	3-4	3-5	3-7	3-9	3-13	3-17	—	3-27
MOUNTING DIAGRAM	5-11	5-21	5-29	5-31	5-39	5-41	5-49	5-51	5-16	5-67	5-59
SCHEMATIC DIAGRAM	5-13	5-23	5-26	5-33	5-36	5-43	5-46	5-53	5-19	5-62	5-56
ELECTRICAL PARTS LIST	7-1	7-4	7-5	7-8	7-11	7-13	7-16	7-18	7-20	7-24	7-24
BOARD SECTION	EA	EB	GA	GB	GC	HA	HH	HW	HX	HY	HZ
CIRCUIT DESCRIPTION	3-29	3-23	3-25	3-25	—	—	—	—	—	—	—
ADJUSTMENTS	4-14	—	4-11	—	—	—	—	4-18	—	—	—
BLOCK DIAGRAM	3-29	3-23	3-26	3-26	—	—	—	—	—	—	—
MOUNTING DIAGRAM	5-65	5-67	5-69	5-68	5-87	5-75	5-74	5-74	5-74	5-76	5-83
SCHEMATIC DIAGRAM	5-62	5-62	5-71	5-71	5-89	5-77	5-77	5-77	5-77	5-77	5-80
ELECTRICAL PARTS LIST	7-27	7-29	7-29	7-32	7-33	7-33	7-33	7-33	7-33	7-33	7-35
BOARD SECTION	P	QA	QB	TB	V	W	X	Y	Z		
CIRCUIT DESCRIPTION	—	3-1	3-1	—	—	—	—	—	—		
ADJUSTMENTS	—	—	—	—	—	—	—	—	—		
BLOCK DIAGRAM	—	3-2	3-2	—	—	—	—	—	—		
MOUNTING DIAGRAM	5-67	5-86	5-87	5-91	5-88	5-87	5-74	5-74	5-95		
SCHEMATIC DIAGRAM	5-62	5-89	5-89	5-93	5-89	5-89	5-77	5-77	—		
ELECTRICAL PARTS LIST	7-38	7-38	7-38	7-38	7-39	7-39	7-39	7-39	7-39		

4-4. SUB CONTROL PANEL LOCATION



#### 4-5. SET-UP ADJUSTMENT IN CASE OF PICTURE

##### TUBE REPLACEMENT

When the picture tube has been replaced, make the following adjustments. Convergence and white balance are normally adjusted by POT's on the sub control panel.

(Refer to page 4-9)

##### [Jigs Tools and Measurement Equipment Required]

1. SIGNAL GENERATOR (TEKTRONIX 1410,1411 Series).
2. COLOR ANALYZER
3. LUMINANCE METER

##### [Landing adjustment]

1. Connect signal generator and receive a white signal.
2. Set BRIGHTNESS and CONTRAST MANUAL switch to pre-set (□).
3. Face the CRT screen toward East (or West) and press the DEGAUSS switch.
4. Adjust the purity adjusting screw in the center.

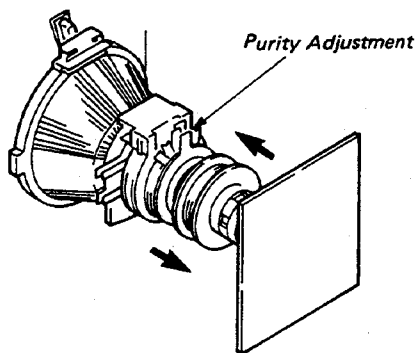


Fig. 1-1.

5. Slide DY (Deflection Yoke) as far forward as possible.
6. Set the neck assembly in the position shown in Fig. 1-2.

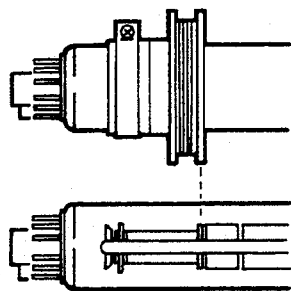


Fig. 1-2.

7. Set the screen to green only (R and B on the FRONT PANEL (L)) are in the IN position and G in the OUT position).
8. Adjust the purity magnet so that the center of screen becomes green as shown in Fig. 1-3.

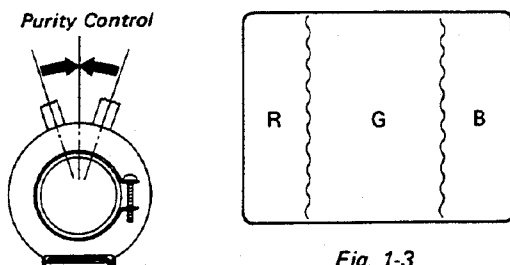


Fig. 1-3.

9. Slide DY back for uniform green raster.
10. Make the screen red only (G and B on the FRONT PANEL (L)) are in the IN position and R in the OUT position) and check landing.
11. Make the screen blue only (R and G on the FRONT PANEL (L)) are in the IN position and B in the OUT position) and check landing.
12. Adjust DY tilt and tighten DY set-screw.
13. Secure the DY with the spacers. (Fig. 1-4)

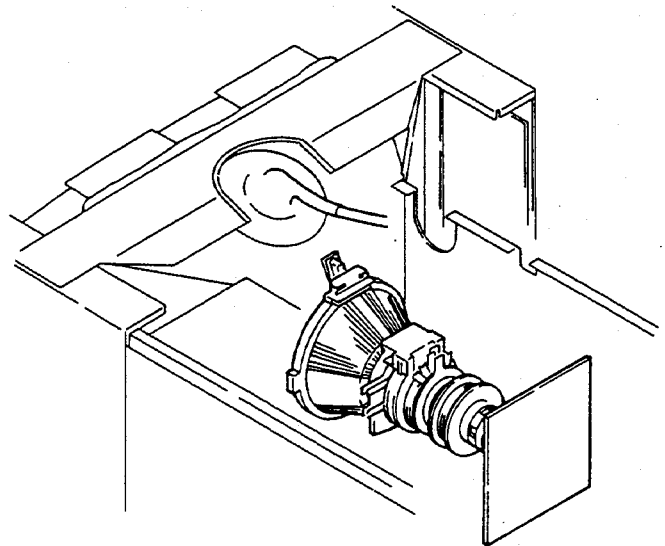
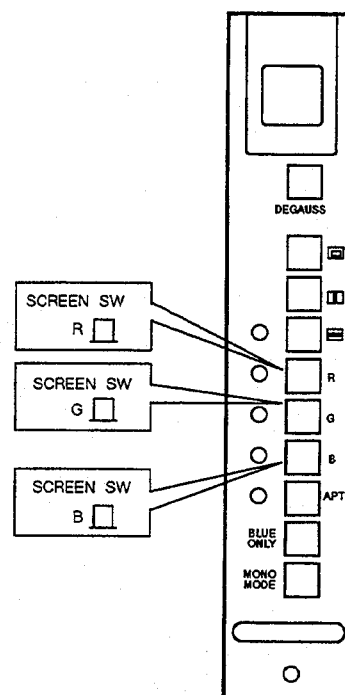


Fig. 1-4.

##### • Final check

After adjustments, check that there is no mislanding by facing the CRT towards East, West, North and South directions.

##### FRONT PANEL (L)





## [Convergence adjustment]

### Preparation:

1. Connect the signal generator to receive the dot signal and crosshatch signal.
2. Adjust with CONTRAST and BRIGHTNESS controls to set to easy-to-monitor position those signals.
3. Set H.STATIC VR (RV17) on D Board to the mechanical center as shown in Fig 1-5.

### (1) Horizontal and Vertical Static Convergence

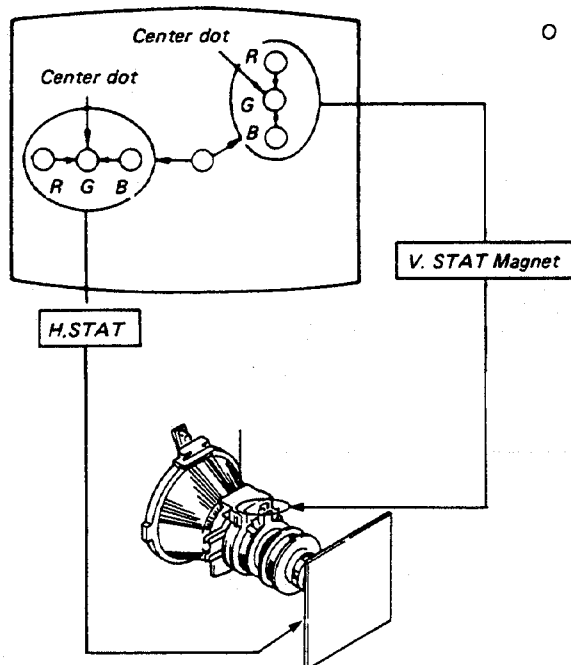
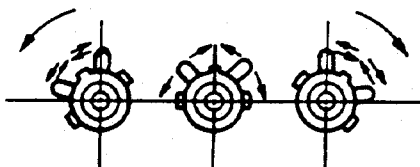
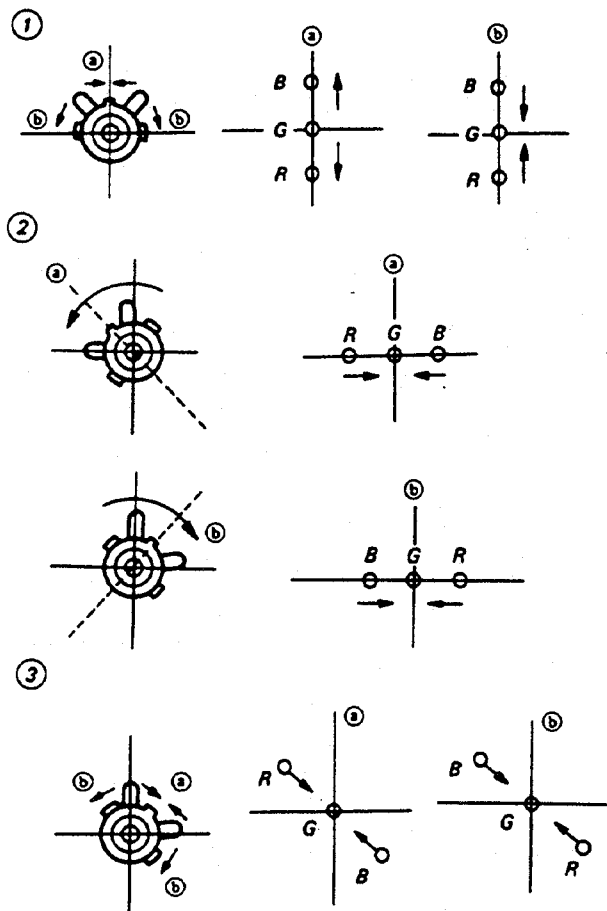


Fig. 1-5

1. Adjust H. STAT VR to coincide red, green and blue dots on the center of screen (Horizontal movement)
  2. Adjust V. STAT magnet to coincide red, green and blue dots on the center of screen (Vertical movement)
  3. If the red, green and blue dots do not coincide on the center of screen with H. STAT VR, perform horizontal convergence adjustment using H. STAT VR and V. STAT magnet as shown below. (In this case, H. STAT VR and V. STAT magnet effect each other.)
- Tilt the V. STAT magnet and adjust static convergence to open or close the V. STAT magnet.



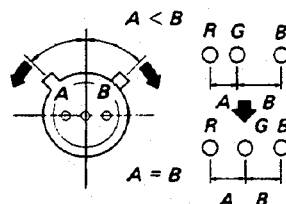
4. When the V. STAT magnet is moved in the direction of arrow (a) and (b), Red, Green and Blue dots move as shown below.



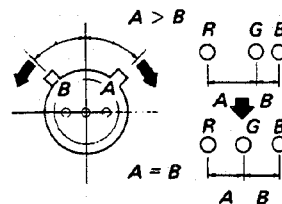
### • HMC and VMC correction for Hexapole Magnet.

1. HMC (Horizontal, Mis. convergence) correction and motion of the Electron Beam with the Hexapole Magnet.

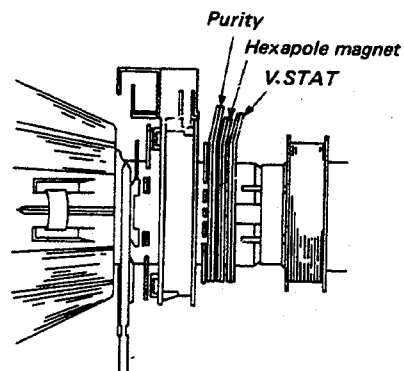
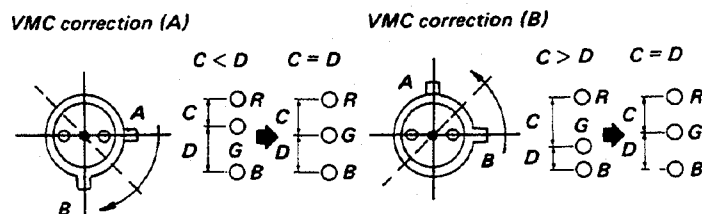
#### HMC correction (A)



#### HMC correction (B)



2. VMC (Vertical, Mis, convergence) correction and motion of the Electron Beam with the Hexapole Magnet.



## (2) Dynamic Convergence Adjustment

### Preparation:

- Before starting, perform Horizontal and Vertical Static Convergence Adjustment.

- Loosen deflection yoke screw.
- Remove deflection yoke spacers.
- Move the deflection yoke for best convergence as shown in Fig. 1-6.
- Tighten the deflection yoke screw.
- Install the deflection yoke spacers.

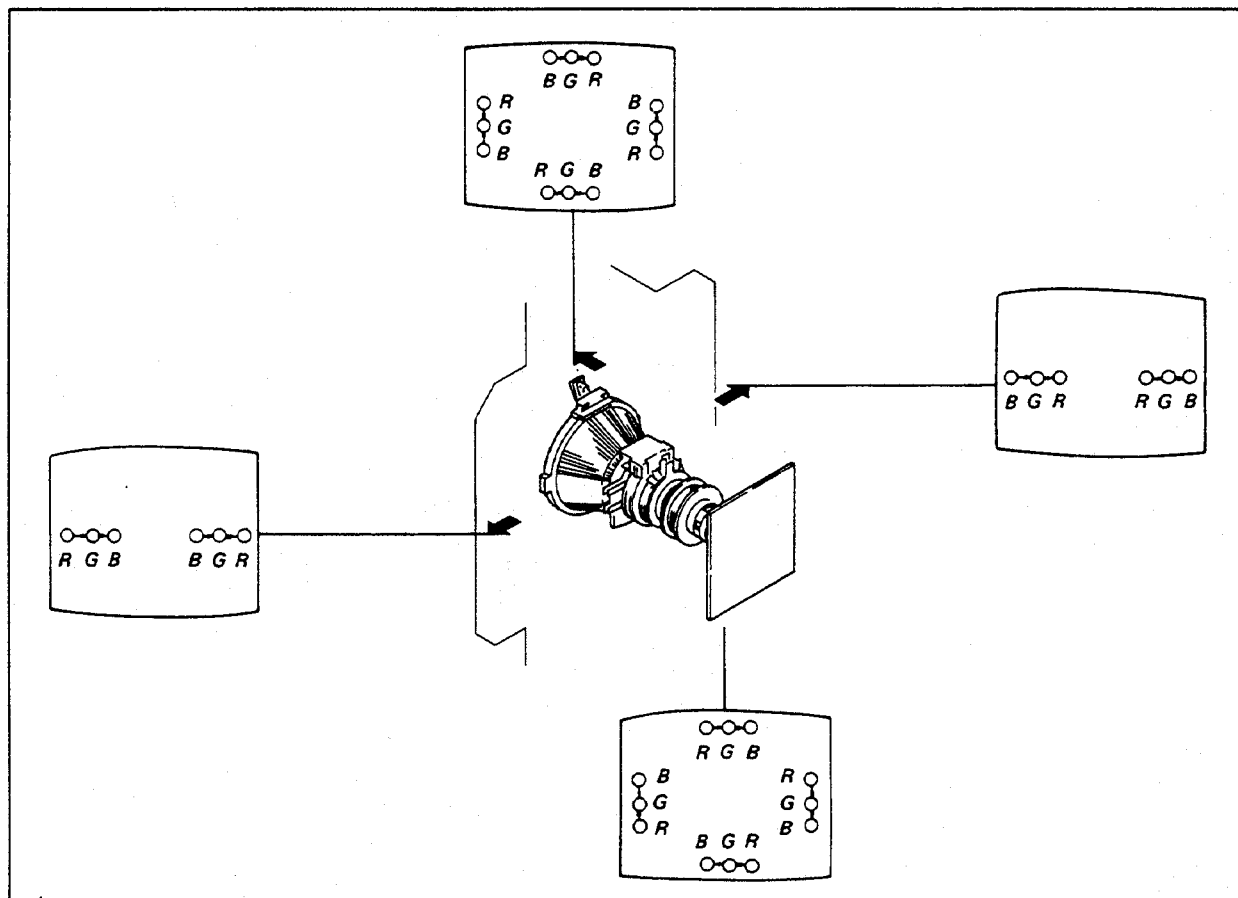
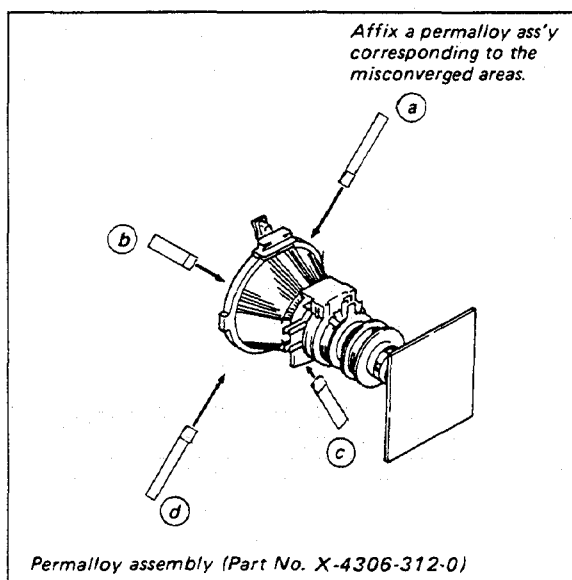
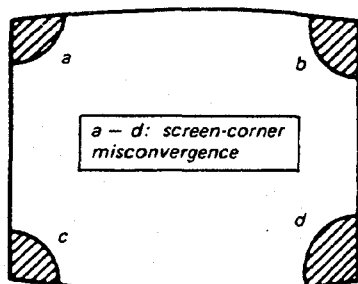


Fig. 1-6

### (3) Screen-corner Convergence



### [CONVERGENCE PROCESS]

- D board adjustment, i.e., convergence adjustment should be performed after the completion of CFD CRT basic adjustment (tilt, etc.). At this time, set RV15, 16, 17, 18, 19 and 20 on the D board to mid-range.
  - UNDER SCAN switch ..... NOR(□)
1. Adjust the vertical static convergence with V.STAT (RV20) at the left side of control panel as shown in left of Fig. 1-7.
  2. Adjust the horizontal static convergence with H.STAT (RV17) at the left side of control panel as shown in right of Fig. 1-7.

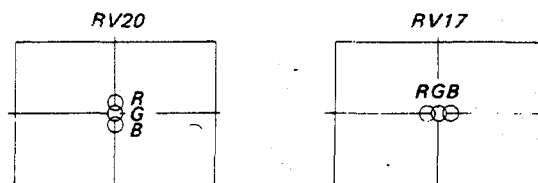


Fig. 1-7

3. Adjust the vertical convergence with X.C.T (RV18) on the D board as shown in left upper corner of Fig. 1-8.
4. Adjust the vertical convergence with X.C.B (RV19) on the D board as shown in left lower corner of Fig. 1-8.

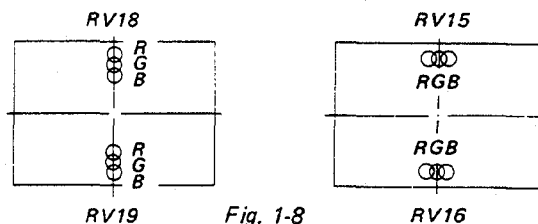


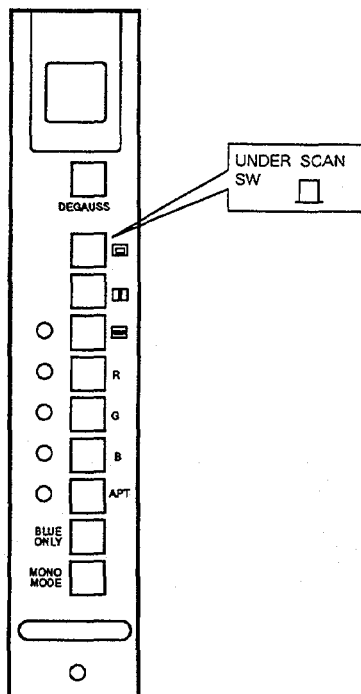
Fig. 1-8

5. Adjust the horizontal convergence with Y.C.T (RV15) on the D board as shown in right upper corner of Fig. 1-8.
6. Adjust the horizontal convergence with Y.C.B (RV16) on the D board as shown in right lower corner of Fig. 1-8.

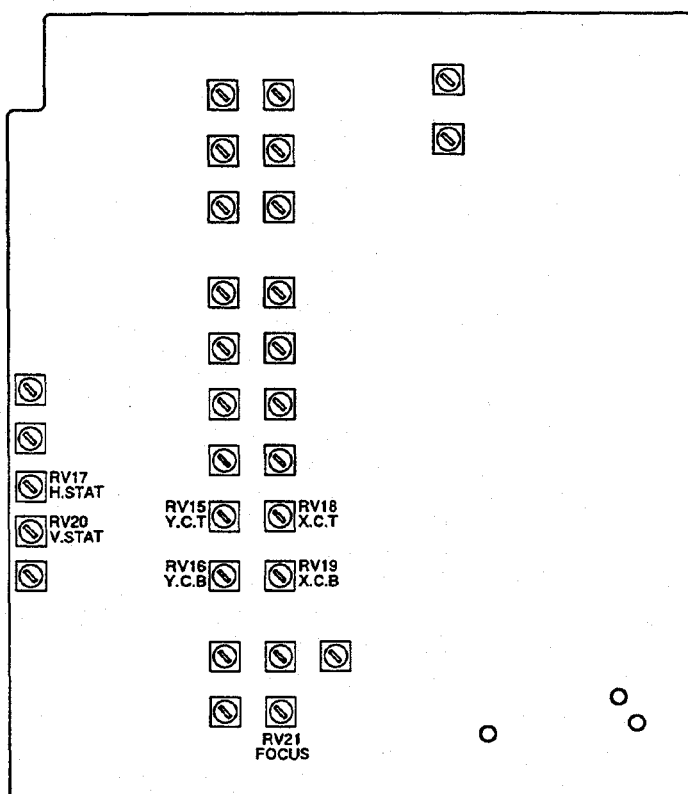
### Focus adjustment

Turn FOCUS (RV21) on the D board so that the focus point at the center of picture is optimum.

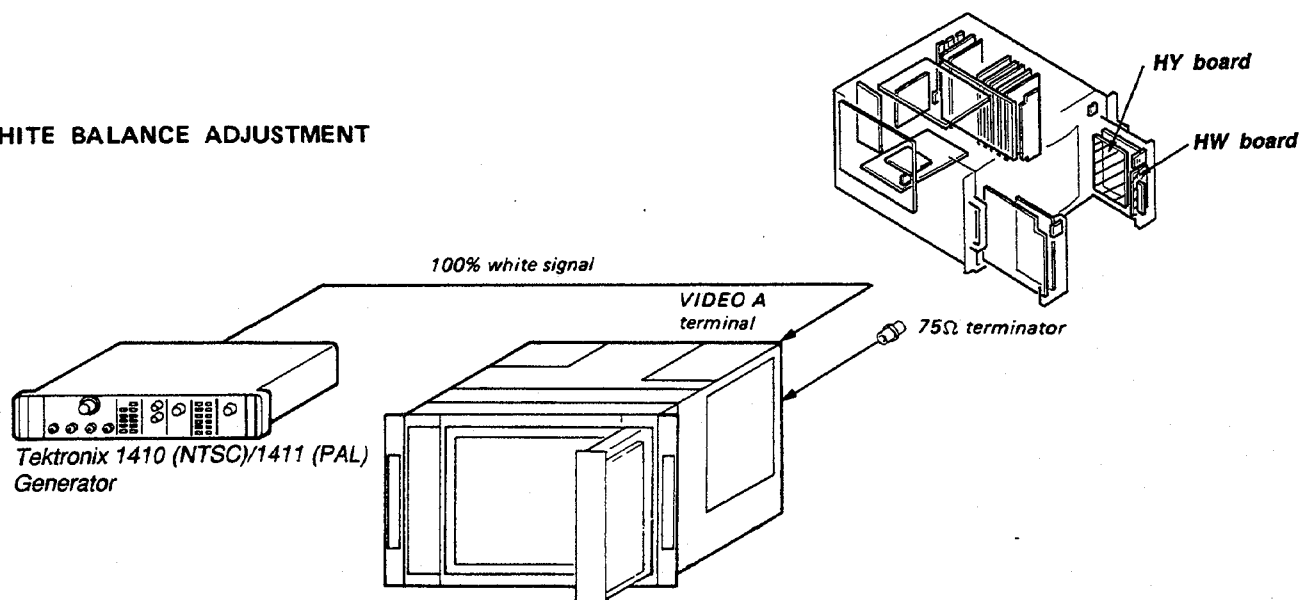
FRONT PANEL(L)



D board

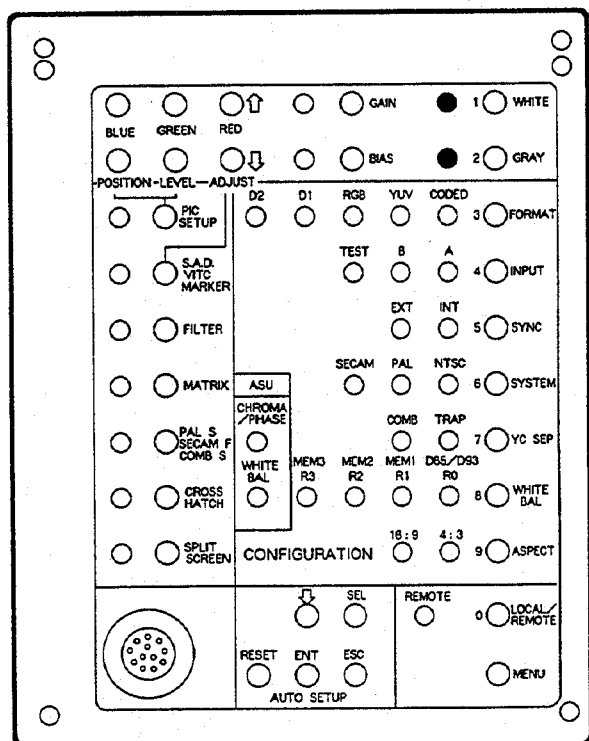


## WHITE BALANCE ADJUSTMENT

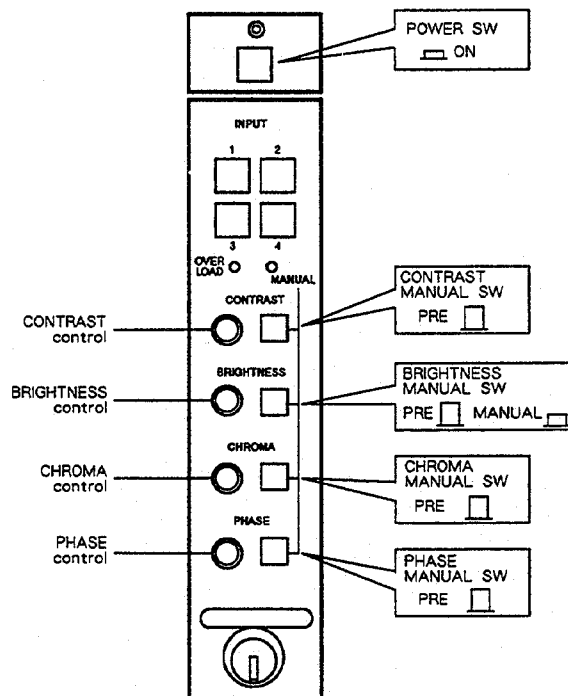


1. Input 100% white signal to VIDEO A connector.
2. Gray button ..... ON
3. BRIGHTNESS MANUAL switch ..... MANUAL. ( ☐ )  
CONTRAST MANUAL switch ..... MANUAL. ( ☐ )
4. Turn BRIGHT and CONTRAST to become 100 with PRESET MENU.  
SAVE the DATA.
5. Switch off the MANUAL switches of CONTRAST and BRIGHT.
6. Turn BIAS controls (S21:Red, S23:Green, S32:Blue) on the HY board to adjust the BRIGHTNESS to 3.8 cd/m<sup>2</sup> (nit) and white balance using COLOR ANALYZER and check 3.8 cd/m<sup>2</sup> (nit) by LUMINANCE METER.
7. Gray button ..... OFF
8. Turn GAIN controls (S20:Red, S22:Green, S31:Blue) on the HY board to adjust the BRIGHTNESS at HIGH LIGHT to 137 cd/m<sup>2</sup> (nit) and white balance using COLOR ANALYZER and check 137 cd/m<sup>2</sup> (nit) by LUMINANCE METER.
9. Repeat procedure steps 6 to 8 if necessary.
10. Save the data with SAVE WHITE BALANCE MENU.

### SUB CONTROL PANEL (HY board)





### FRONT PANEL (R)



4-6. SAFETY RELATED ADJUSTMENTS

**+B PROTECTOR** (R52, R53)

When replacing the following components (marked  on the schematic diagram), make this confirmation.


-  GA Board . . . R52, R53, Q14, Q13
- GB Board . . . D5, D6, R5, Q4, Q3, D7, R4, Q5, D8, R19, R20, R21, R22


It is necessary to use a digital multimeter for this confirmation.

Connect a digital multimeter to TP2 on GA Board.

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (manual bottom is out.)
2. Short-circuit R55 on GA Board.
3. Connect 100k $\Omega$  variable resistor with R68 in parallel on GA Board.
4. Confirm that the reading on the digital multimeter drops abruptly from +182.0V ~ +216.0V to 0V by turning the 100k $\Omega$  variable resistor so that the value of the resistor decrease from maximum value.
5. If step 4 isn't satisfied, check that the mounted components are correct.

**+B MAX CONFIRMATION** (R67, R68)

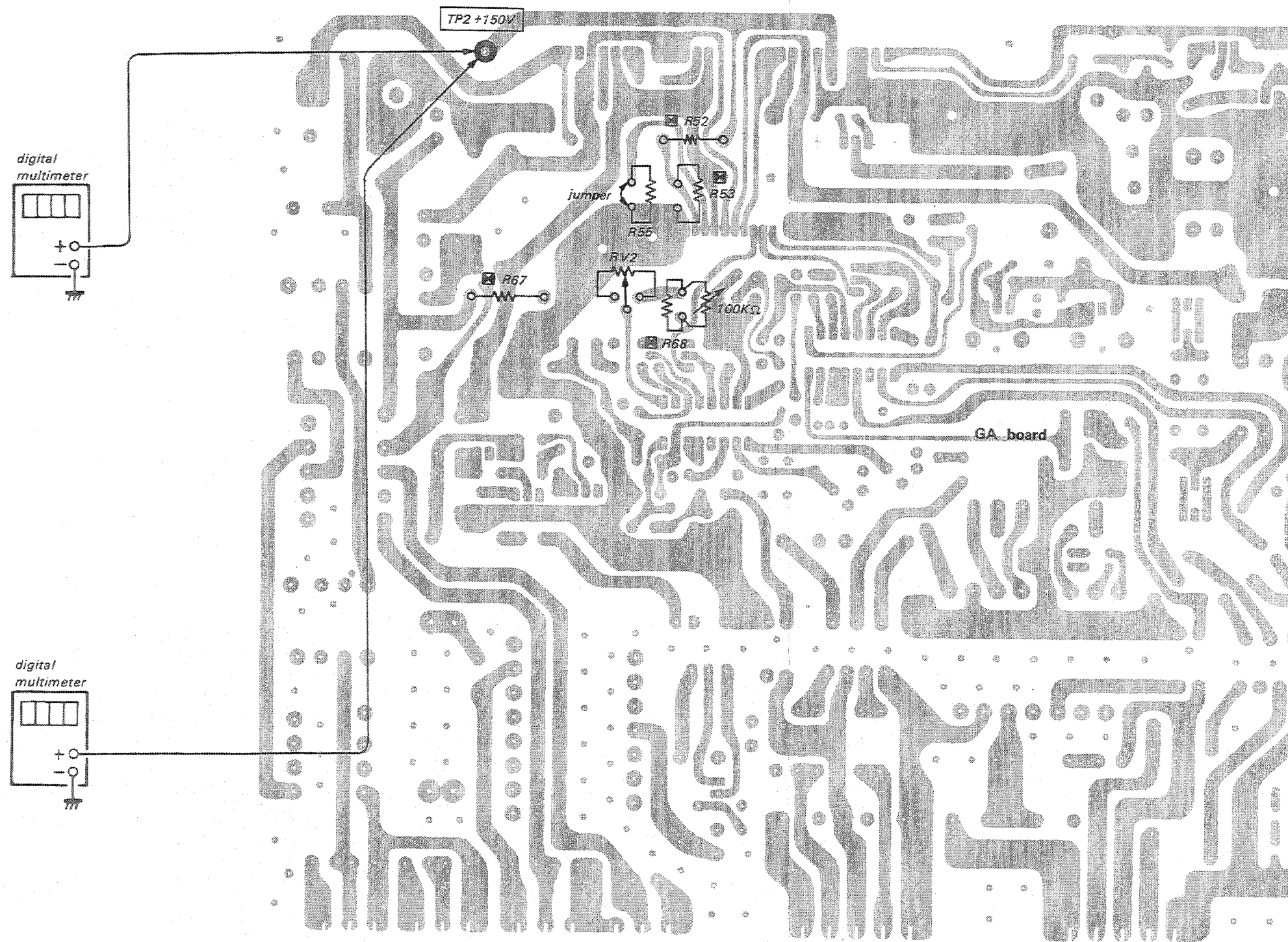
When replacing the following components (marked  on the schematic diagram), make this confirmation.

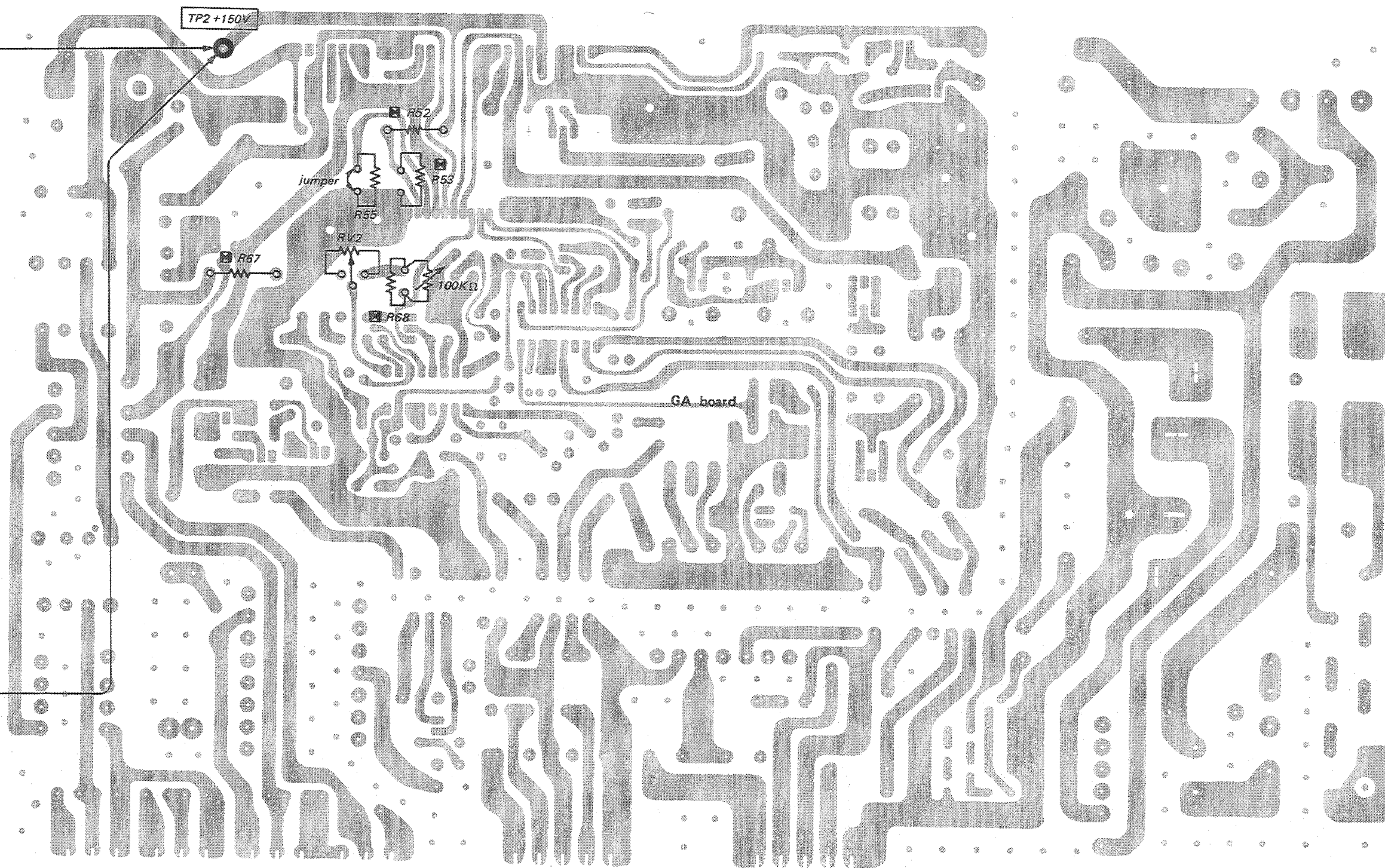
-  GA Board . . . R67, RV2, R68, IC3, C59, R78

It is necessary to use a digital multimeter for this confirmation.

Connect a digital multimeter to TP2 on GA Board.

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (manual bottom is out.)
2. Confirm that the reading on the digital multimeter is between +155.0V and +175.0V when RV2 variable resistor is turned to fully clockwise.
3. After confirmation, make the reading on the digital multimeter into +150.0V  $\pm$ 0.5V by adjusting RV2 on GA Board.







## HIGH VOLTAGE HOLD DOWN ADJUSTMENT AND CONFIRMATION

(☒ R106, R108)

When replacing the following components (marked ☒ on the schematic diagram), make this adjustment.

- ☒ HVR
- ☒ EA Board .... IC4, D24, D25, D27, D29, R89, R90, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111

It is necessary to use an electrostatic voltmeter or equivalent for this adjustment. Connect the electrostatic voltmeter to the anode cap.

Connect the DC current meter (3 mA range, accuracy of 1.0 class or more). Even though an electrostatic voltmeter may not be used, connect digital multimeters to TP2, TP6 and TP5 (GND) on EA Board.

**Note:** Use an electrostatic voltmeter which is calibrated, and which has  $2 \times 10^9 \Omega$  or more input impedance. example: ESH-27X or ESH-23X of the SINGER COMPANY.

Use a digital multimeter which has 4 digit or more.

### • In case of using electrostatic voltmeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to fully counterclockwise. (Manual button is IN  $\square$ .)
2. Connect 200 k $\Omega$  variable resistor with R75 in parallel on EA Board.
3. Confirm and memorize that the reading on the electrostatic voltmeter drops abruptly from 29.5 kV through 27.5 kV to 0V by turning slowly the 200 k $\Omega$  variable resistor so that the value of the resistor decrease from maximum value.
4. If step 3 is not satisfied, select the value of R106 and R108 (1/6W metal-film) and repeat above step 3.
5. Adjust so that the reading of current meter connected becomes 1000  $\mu$ A by turning CONTRAST and BRIGHTNESS controls.
6. Confirm and memorize that the reading on the electrostatic voltmeter drops abruptly from 28.2 kV through 26.2 kV to 0V by turning slowly the 200 k $\Omega$  variable resistor and check the difference of memorized voltage between in steps 3 and 6 is over 1.15 kV.

### • In case of using a digital multimeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to fully counterclockwise. (Manual button is IN  $\square$ .)
2. Connect 200 k $\Omega$  variable resistor with R75 in parallel on EA BOARD.
3. Confirm that the reading on the digital multimeter of TP2 on EA Board is between 16.75V and 16.95V.
4. If step 3 is not satisfied, select the value of R106 and R108 (1/6W metal-film) and repeat above step 3.
5. Confirm that the reading on the digital multimeter at TP6 (or TP6) on EA Board drops abruptly from between 16.75V and 16.95V by turning slowly the 200 k $\Omega$  variable resistor from maximum value.
6. If step 5 is not satisfied, select the value of R106 and R108 (1/6W metal-film) and repeat above steps 3 through 5.

7. Adjust so that the reading of current meter connected becomes 1000  $\mu$ A by turning CONTRAST and BRIGHTNESS controls.
8. Confirm that the reading on the digital multimeter at TP6 on EA Board drops abruptly from between 16.04V and 16.24V by turning slowly the 200 k $\Omega$  variable resistor so that the value of the resistor decrease from maximum value.
9. If step 8 is not satisfied, select the value of R106 and R108 (1/6W metal-film) and repeat above steps 3 through 6.)

## HIGH VOLTAGE REGULATOR CONFIRMATION

(☒ R72, R75)

When replacing the following components (marked ☒ on the schematic diagram), make this adjustment.

☒ HVR

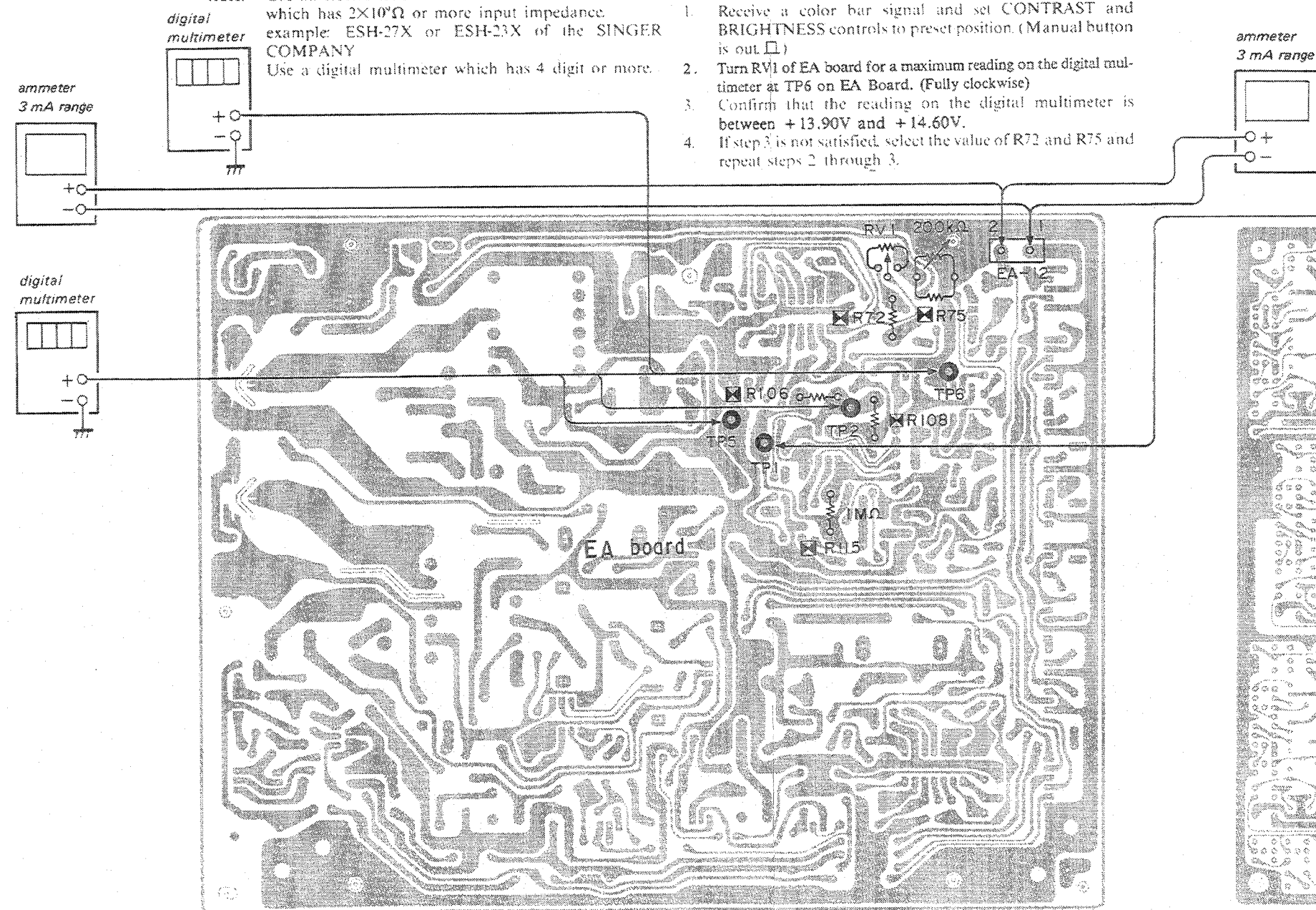
☒ EA Board .... IC2, IC3, R61, R62, R71, R72, R73, R74, R75, R88, RV1

It is necessary to use an electrostatic voltmeter or equivalent for this adjustment. Connect the electrostatic voltmeter to the anode cap.

Even though an electrostatic voltmeter may not be used, connect digital multimeter to TP6 on EA Board.

**Note:** Use an electrostatic voltmeter which is calibrated, and which has  $2 \times 10^9 \Omega$  or more input impedance. example: ESH-27X or ESH-23X of the SINGER COMPANY.

Use a digital multimeter which has 4 digit or more.



### • In case of using an electrostatic voltmeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (Manual button is out  $\square$ .)
2. Turn RV1 on EA Board for a maximum reading on the electrostatic voltmeter. (Fully clockwise)
3. Confirm that the reading on the electrostatic voltmeter is between 25.23kV and 25.47kV.
4. If step 3 is not satisfied, select the value of R72 and R75 and repeat above steps 2 through 3.
5. After confirmation, adjust so that the reading of electrostatic voltmeter connected becomes 25.0 kV by turning RV1.

### • In case of using a digital multimeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (Manual button is out  $\square$ .)
2. Turn RV1 of EA board for a maximum reading on the digital multimeter at TP6 on EA Board. (Fully clockwise)
3. Confirm that the reading on the digital multimeter is between +13.90V and +14.60V.
4. If step 3 is not satisfied, select the value of R72 and R75 and repeat steps 2 through 3.

## BEAM CURRENT

(☒ R115)

When replacing the schematic diagram

☒ EA Board ....

1

1

P Board ....

1

It is necessary to confirmation.

Connect the digit

1.0 class or more)

ammeter  
3 mA range



connected  
RIGHT-

er at TP6  
04V and  
sistor so  
maximum

nd R108  
ugh 6.)

### HIGH VOLTAGE REGULATOR CONFIRMATION

(R72, R75)

When replacing the following components (marked ☒ on the schematic diagram), make this adjustment:

- ☒ HVR
- ☒ EA Board ... IC2, IC3, R61, R62, R71, R72, R73, R74, R75, R88, RV1

It is necessary to use an electrostatic voltmeter or equivalent for this adjustment. Connect the electrostatic voltmeter to the anode cap.

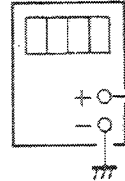
Even though an electrostatic voltmeter may not be used, connect digital multimeter to TP6 on EA Board.

**Note:** Use an electrostatic voltmeter which is calibrated and which has  $2 \times 10^9 \Omega$  or more input impedance.

example: ESH-27X or ESH-23X of the SINGER COMPANY

Use a digital multimeter which has 4 digit or more.

digital  
multimeter



### In case of using an electrostatic voltmeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (Manual button is out ☐)
2. Turn RV1 on EA Board for a maximum reading on the electrostatic voltmeter. (Fully clockwise)
3. Confirm that the reading on the electrostatic voltmeter is between 25.23kV and 25.47kV.
4. If step 3 is not satisfied, select the value of R72 and R75 and repeat above steps 2 through 3.
5. After confirmation, adjust so that the reading of electrostatic voltmeter connected becomes 25.0 kV by turning RV1.

### In case of using a digital multimeter

1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to preset position. (Manual button is out ☐)
2. Turn RV1 of EA board for a maximum reading on the digital multimeter at TP6 on EA Board. (Fully clockwise)
3. Confirm that the reading on the digital multimeter is between +13.90V and +14.60V.
4. If step 3 is not satisfied, select the value of R72 and R75 and repeat steps 2 through 3.

### BEAM CURRENT PROTECTOR CONFIRMATION

(R115)

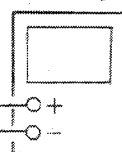
When replacing the following components (marked ☒ on the schematic diagram), make this confirmation:

- ☒ EA Board ... IC4, D24, D26, D27, D29, R89, R90, R102, R103, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124
- ☒ P Board ... FBT

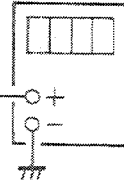
It is necessary to use a regulated digital multimeter for this confirmation.

Connect the digital multimeters to TP1 on EA Board. Connect the current meter to EA-12. (3 mA Range, accuracy of 1.0 class or more)

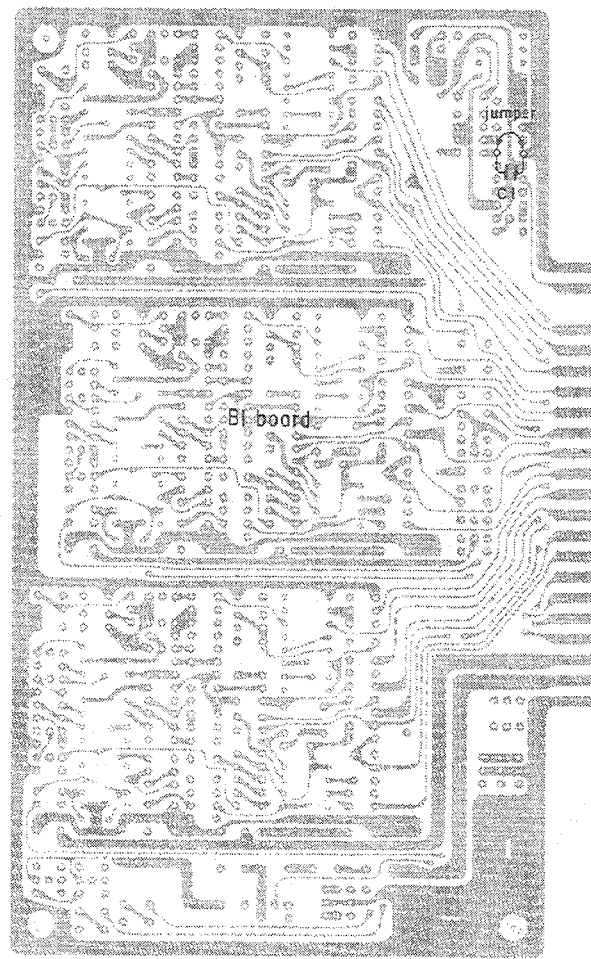
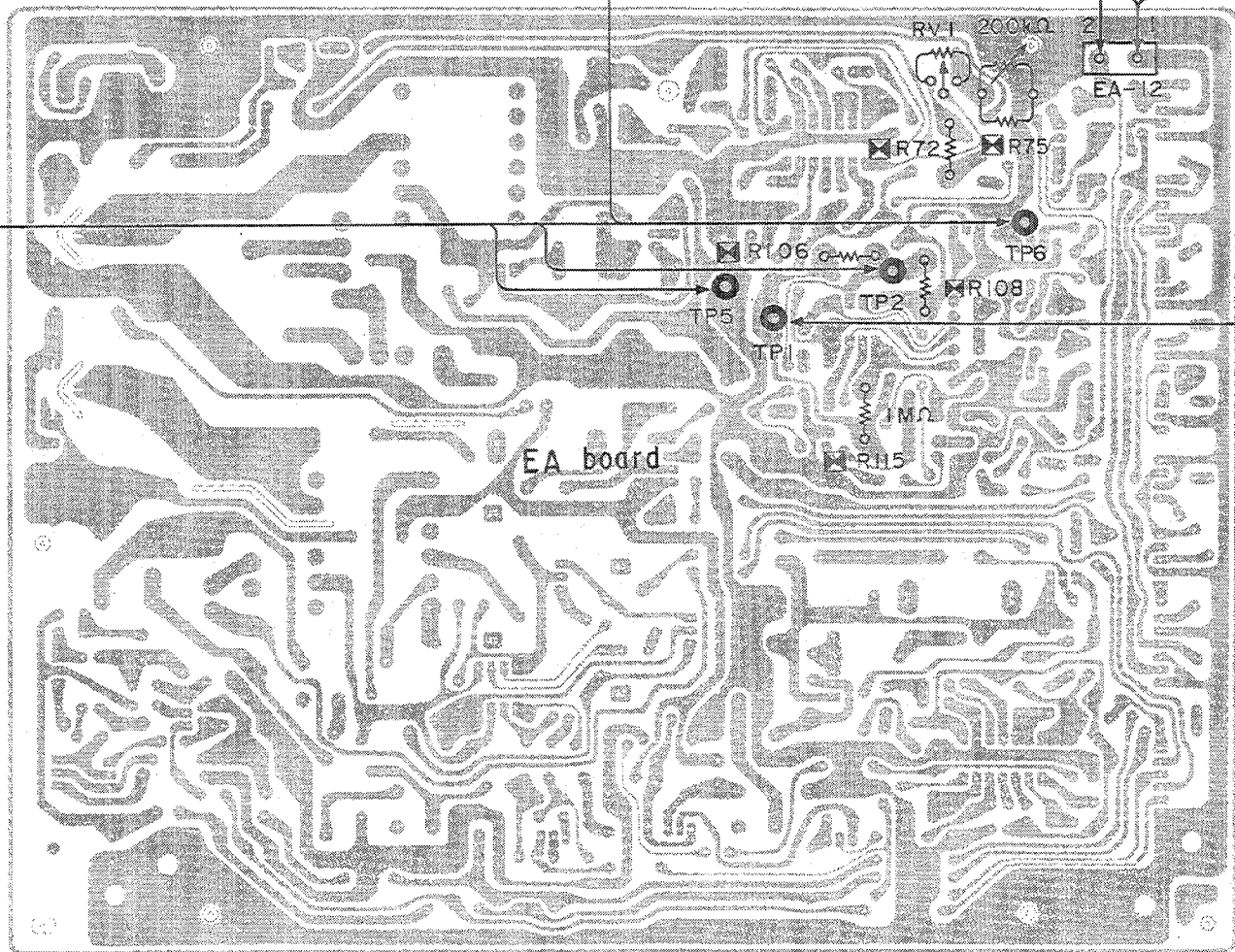
ammeter  
3 mA range



digital  
multimeter



1. Receive a color bar signal and set CONTRAST and BRIGHTNESS controls to mechanical center. (Manual button is IN ☐)
2. Confirm that the reading on the digital multimeter of TP1 on EA Board is between +31.0V and +33.5V.
3. Short-circuit CI of BI Board.
4. Confirm that the picture disappears in the current meter's reading range of 1.45 mA to 1.97 mA while increasing the luminance by turning CONTRAST and BRIGHTNESS controls slowly (0.1 mA/sec) in MANUAL mode. (WHITE SW ON)
5. If step 4 is not satisfied, select the value of R115 (1/6W metal-film) and repeat above step 4.
6. Set BI Board (short-circuited CI) and EA-12 to the original condition.



## 4-7. CIRCUIT ADJUSTMENTS

- To make the following adjustments, unless otherwise specified, the controls knobs and switches shall be preset as described below.

### FRONT PANEL (R)

- INPUT selector ..... 1 HX board
- CONTRAST MANUAL switch ..... PRESET
- BRIGHTNESS MANUAL switch ..... PRESET
- CHROMA MANUAL switch ..... PRESET
- PHASE MANUAL switch ..... PRESET

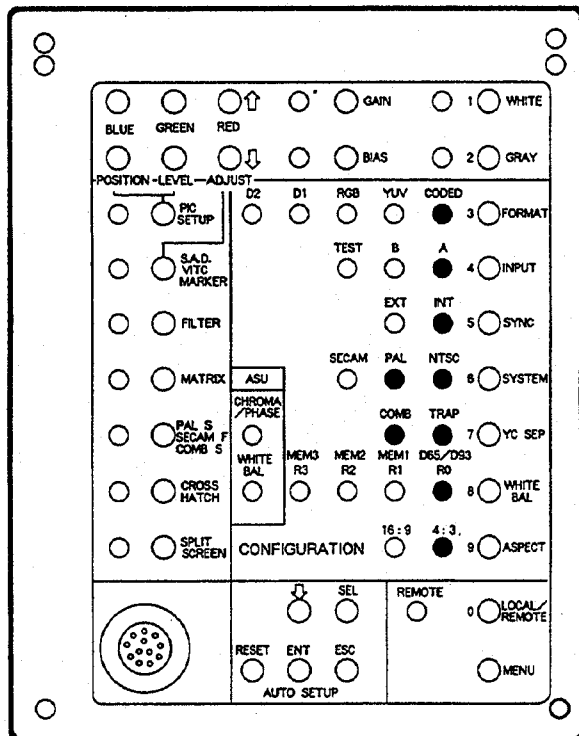
### FRONT PANEL (L)

- SCAN MODE switch
- ☒ UNDER SCAN ..... NOR
- ☒ H. DELAY ..... NOR
- ☒ V. DELAY ..... NOR
- SCREEN switch (R) ..... NOR
- SCREEN switch (G) ..... NOR
- SCREEN switch (B) ..... NOR
- APT switch ..... NOR
- BLUE ONLY switch ..... NOR
- MODE selector ..... AUTO

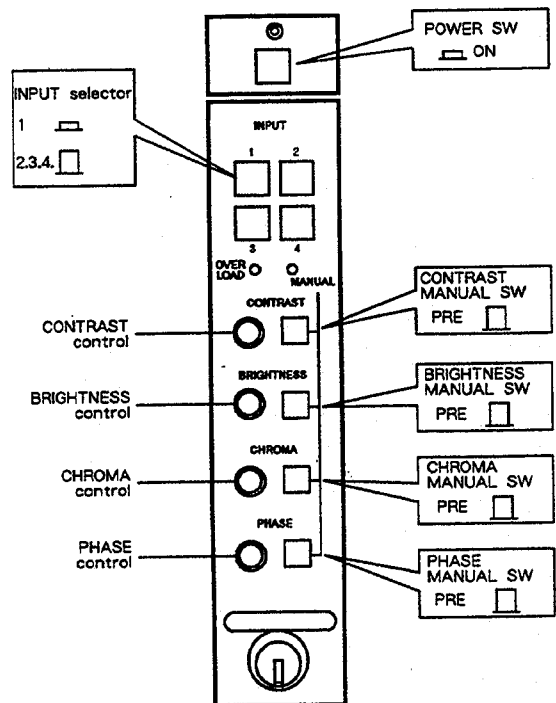
### SUB CONTROL PANEL

- FORMAT button ..... CODED
- INPUT button ..... A
- SYNC button ..... INT
- COLOR SYSTEM button ..... NTSC (BVM-1316)
- ..... PAL (BVM-1416P)
- YC SEP button ..... COMB (BVM-1316)
- ..... TRAP (BVM-1416P)
- WHITE BALANCE button ..... D65/D93
- ASPECT button ..... 4 : 3
- PIC SETUP button ..... OFF
- SAD/VITC/MARKER button ..... OFF
- FILTER button ..... OFF
- MATRIX button ..... OFF
- PAL S/SECAM F/COMB S button ..... OFF
- CROSS HATCH button ..... OFF
- SPLIT SCREEN button ..... OFF
- WHITE button ..... OFF
- GRAY button ..... OFF
- AFC switch ..... 2m sec

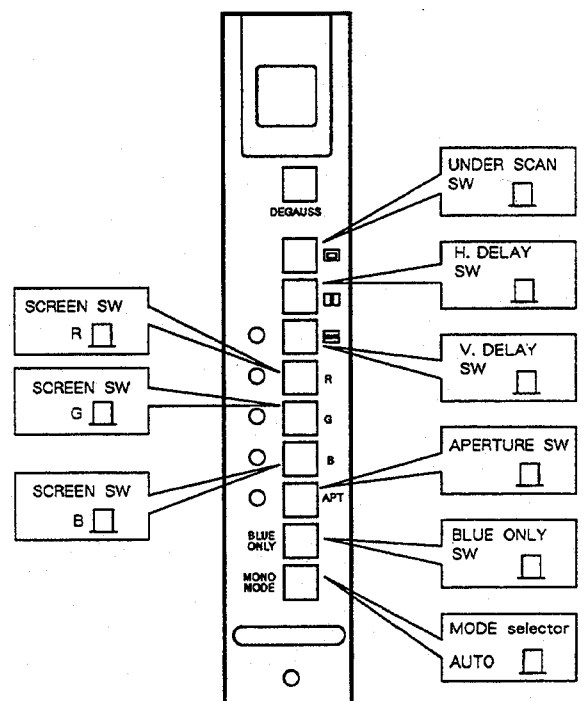
### SUB CONTROL PANEL (HY board)



### FRONT PANEL (R)



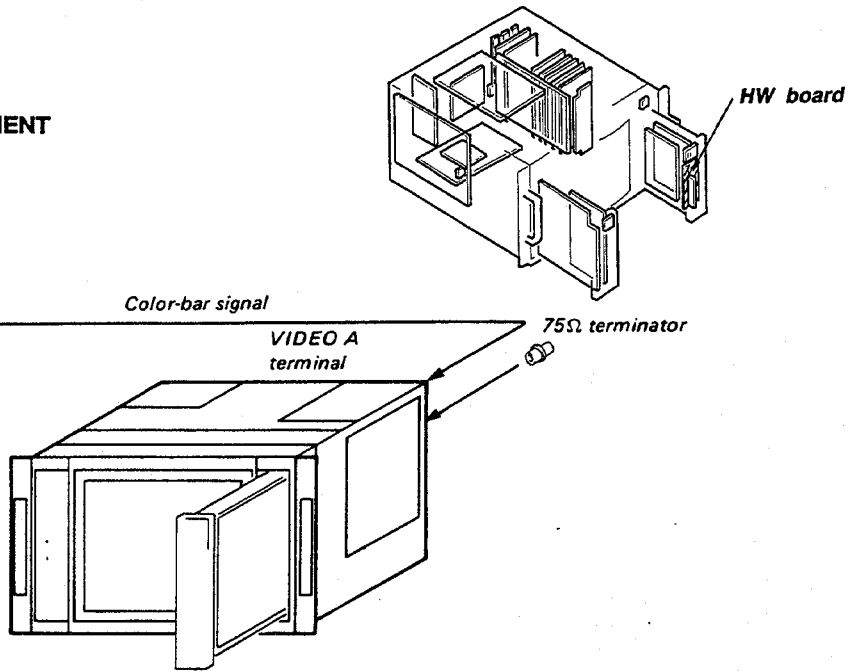
### FRONT PANEL (L)



# 1. SUB CHROMA, SUB PHASE ADJUSTMENT

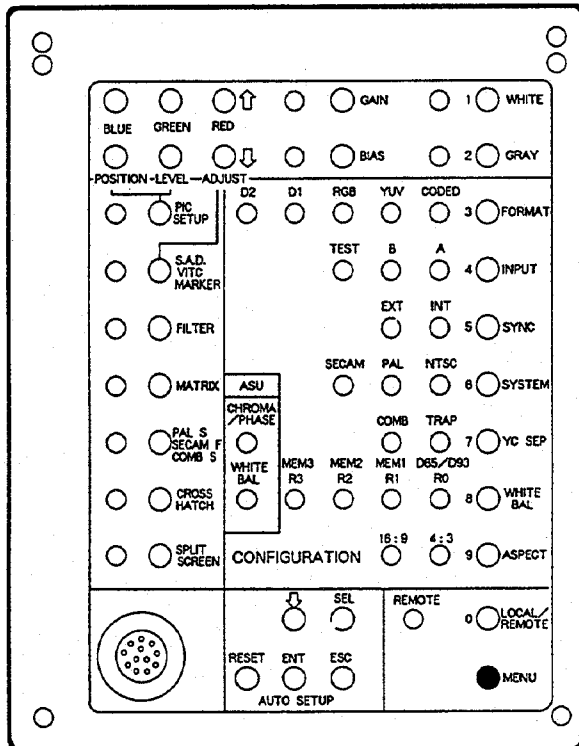
Tektronix 1410 (NTSC)/1411 (PAL) Generator

- NTSC color bar signal  
(FULL FIELD color-bar)  
75% AMPL  
100 IRE  
7.5 IRE set up
- PAL color bar signal  
(FULL FIELD color-bar)  
75% AMPL  
100 IRE

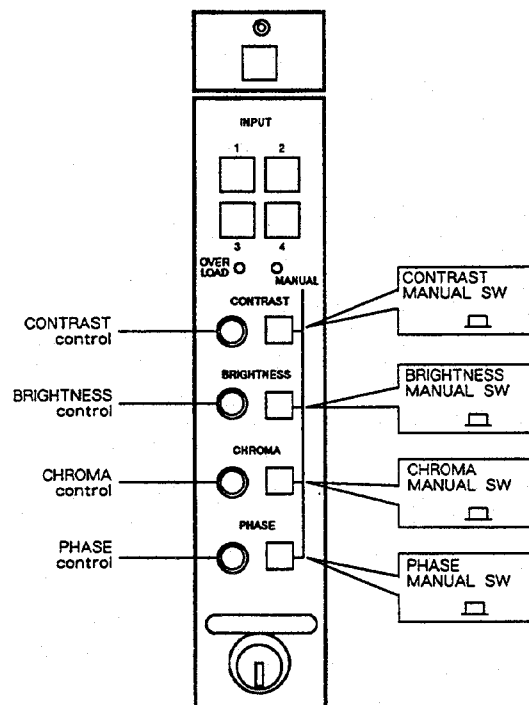


1. Press the MENU switch to select the PRESET menu.
2. CONTRAST, BRIGHT, CHROMA, PHASE MANUAL switch (FRONT PANEL (R)) ..... MANUAL
3. Turn each volume control to adjust so that the value on the screen becomes 100.
4. Save the DATA.

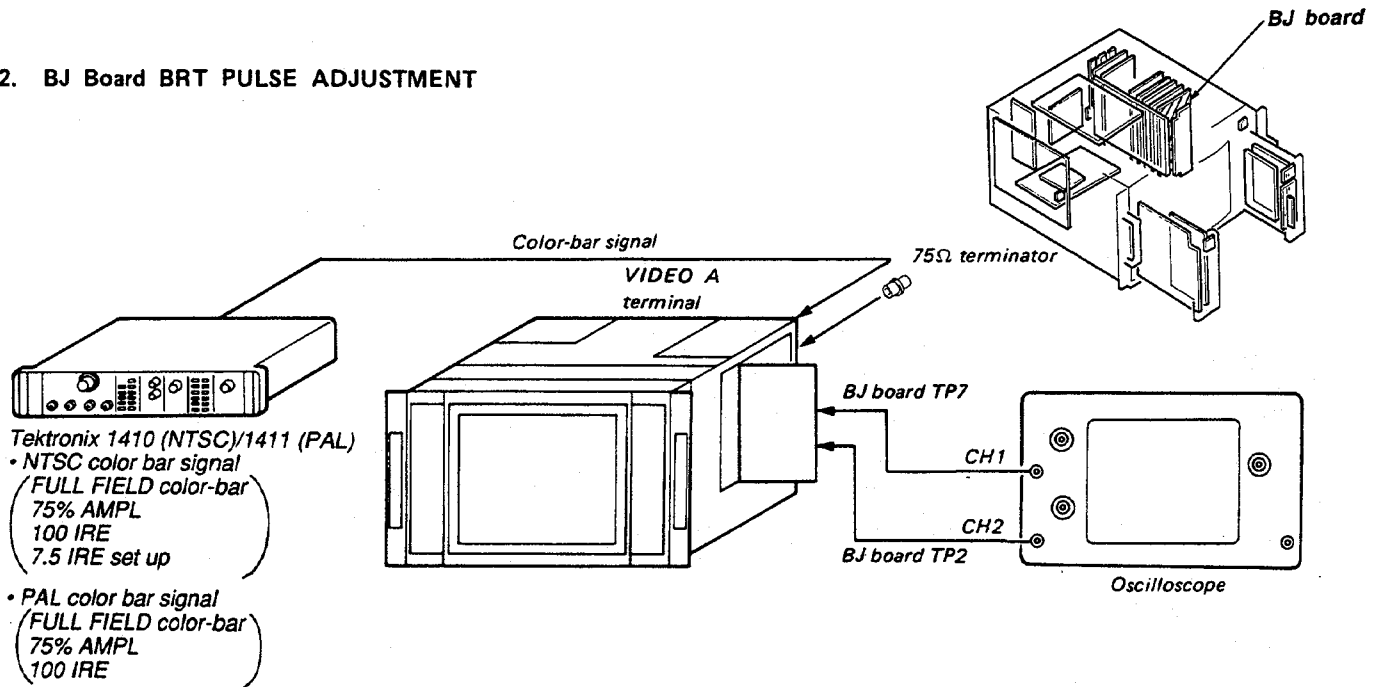
## SUB CONTROL PANEL (HY board)



## FRONT PANEL (R)



## 2. BJ Board BRT PULSE ADJUSTMENT



1. Input a color-bar signal to VIDEO A terminal of the set.
2. Connect an oscilloscope (CH1 probe) to the TP7 of BJ board and oscilloscope (CH2 probe) to the TP2 of BJ board.
3. Adjust RV7 to obtain the waveform on the oscilloscope as shown in Fig. 2-1.

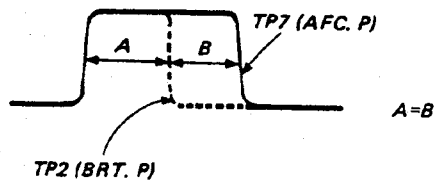
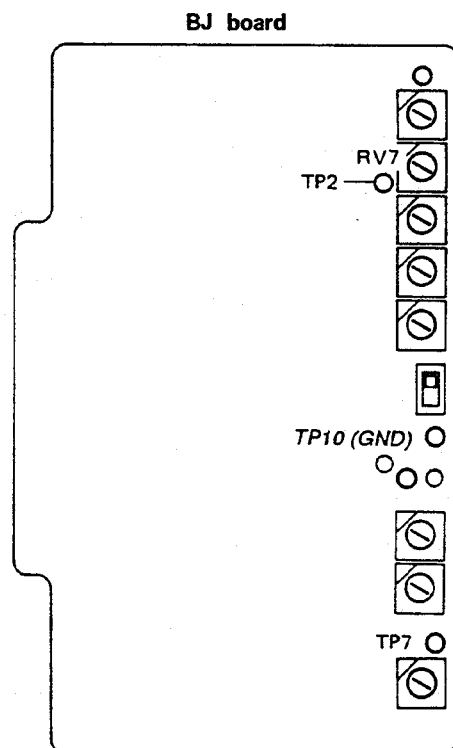
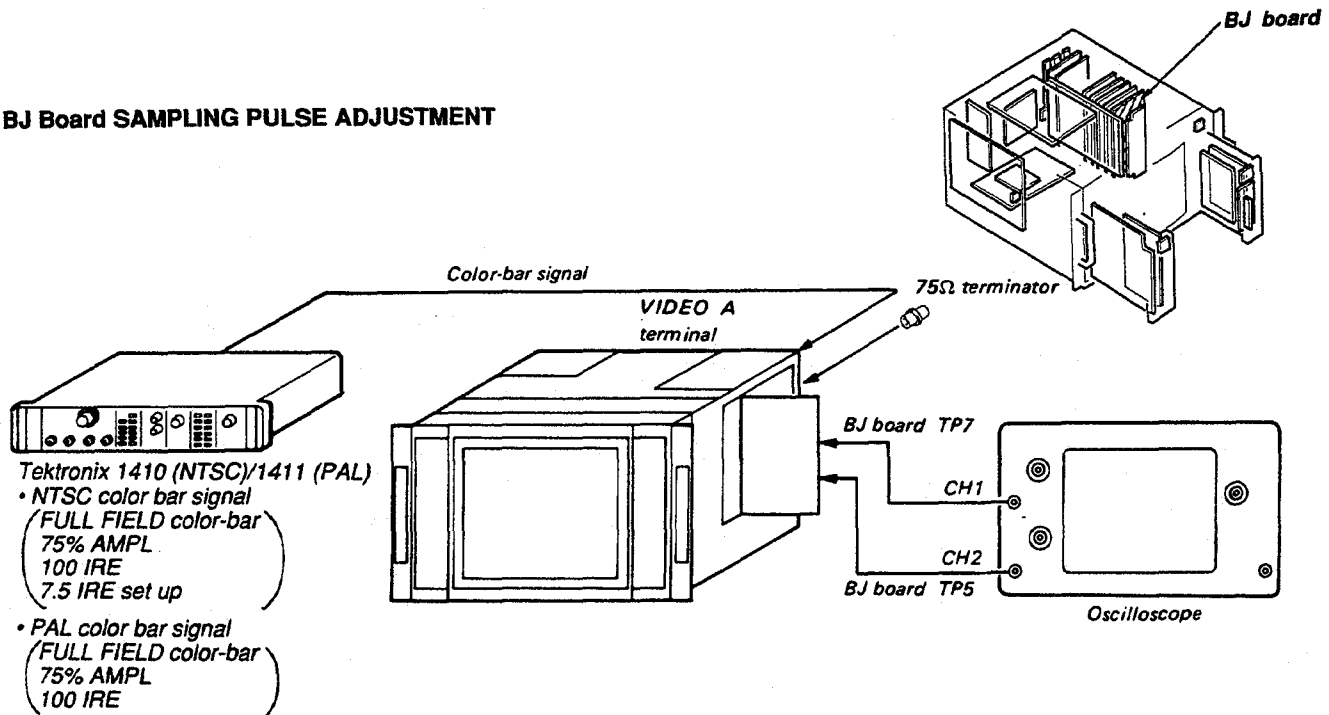


Fig. 2-1



## BJ Board SAMPLING PULSE ADJUSTMENT



1. Input a color-bar signal to VIDEO A terminal of the set.
2. Connect an oscilloscope (CH 1 probe) to the TP7 of BJ board and Connect an oscilloscope (CH 2 probe) to the TP5 of BJ board.
3. Adjust RV5 to obtain the waveform on the oscilloscope as shown in Fig. 2-2.

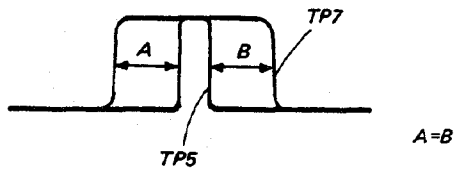
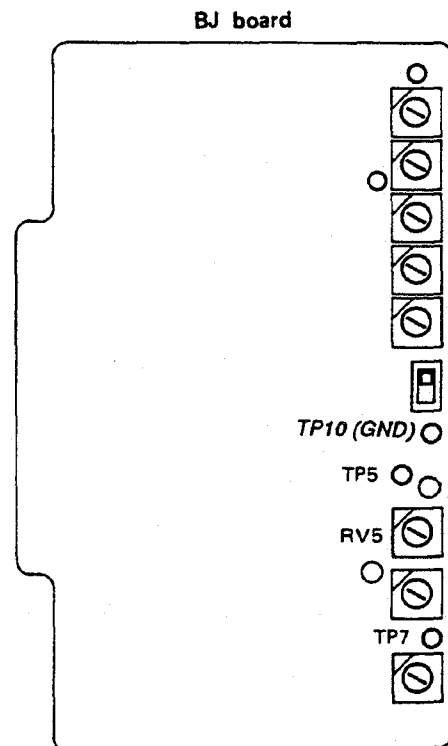
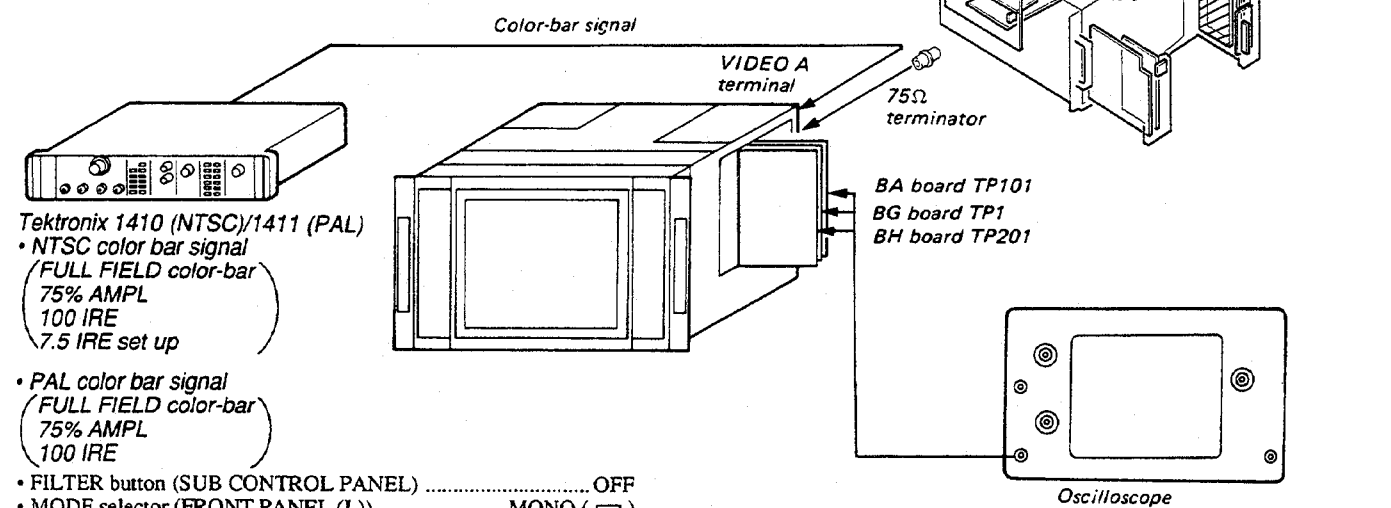


Fig. 2-2



### 3. EACH CHANNEL LEVEL ADJUSTMENT



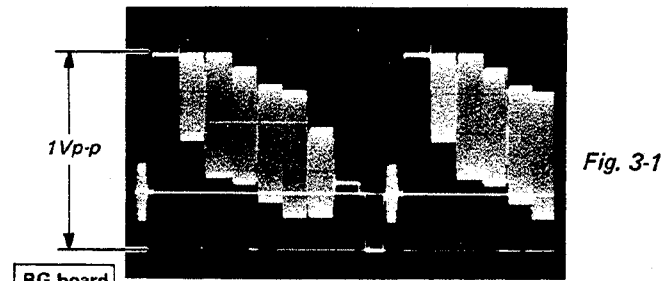
Tektronix 1410 (NTSC)/1411 (PAL)  
• NTSC color bar signal  
(FULL FIELD color-bar)  
75% AMPL  
100 IRE  
7.5 IRE set up

• PAL color bar signal  
(FULL FIELD color-bar)  
75% AMPL  
100 IRE

• FILTER button (SUB CONTROL PANEL) ..... OFF  
• MODE selector (FRONT PANEL (L)) ..... MONO  
• INPUT selector (FRONT PANEL (R)) ..... 1

#### BA board

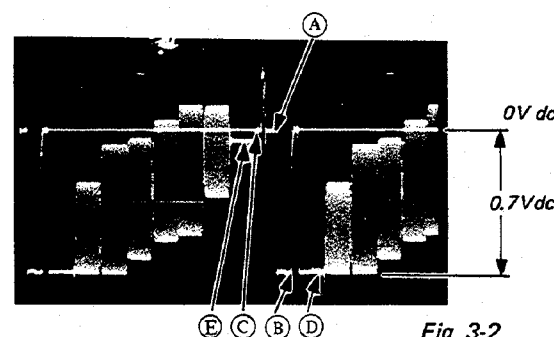
1. Input a color-bar signal to VIDEO A terminal to the set.
2. Connect an oscilloscope to the TP101 of BA board.
3. Adjust to 1.0Vp-p with RV101 of BA board as shown in Fig. 3-1.



#### BG board

4. Connect an oscilloscope to the TP1 of BG board.
5. Adjust to 1.0Vp-p with RV3 of BG board as shown in Fig. 3-1.
6. Connect an oscilloscope to the TP201 of BH board.

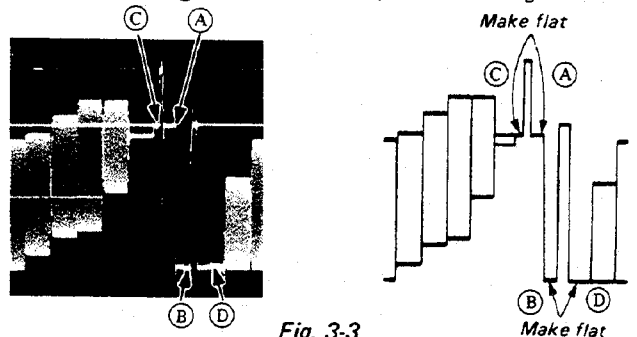
7. Adjust FRONT BRT VR so that (A) (black level) is 0V DC as shown in Fig. 3-2.
8. Adjust FRONT CONT VR so that (B) (100% white level) is -0.7V DC as shown in Fig. 3-2.



- (A) ..... Black level
- (B) ..... 100% White level
- (C) ..... 0 IRE level
- (D) ..... 100 IRE level
- (E) ..... 7.5 IRE level

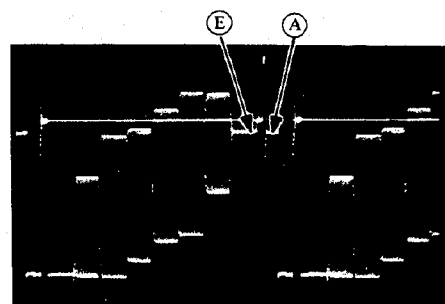
#### BH board

9. S2 (BH Board) .... 0 IRE  
Adjust RV1 of BH board so that the (C) (0 IRE level) coincides with (A) (Black level) as shown in Fig. 3-3.
10. Adjust RV3 of BH board so that the (D) (100 IRE level) coincides with (B) (100% white level) as shown in Fig. 3-3.

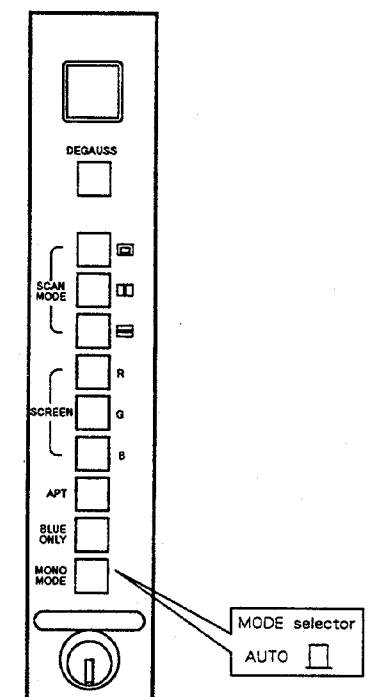


#### BH board

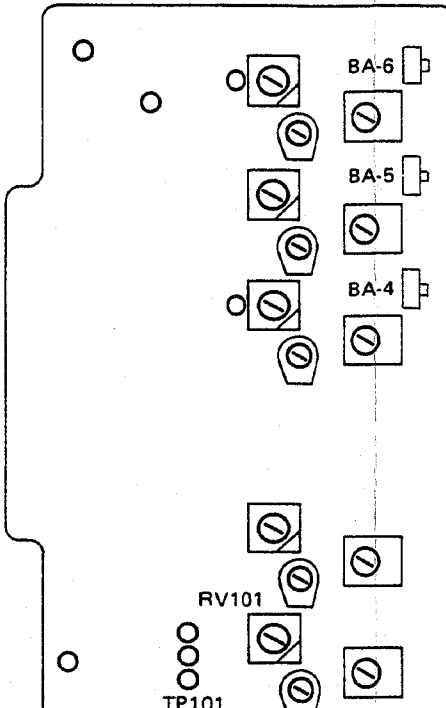
11. S2 (BH Board) ..... 7.5 IRE  
Adjust RV2 of BH board so that the (E) (7.5 IRE level) coincides with (A) (Black level) as shown in Fig. 3-4.
12. Set S2 (BH Board) to 0 IRE.



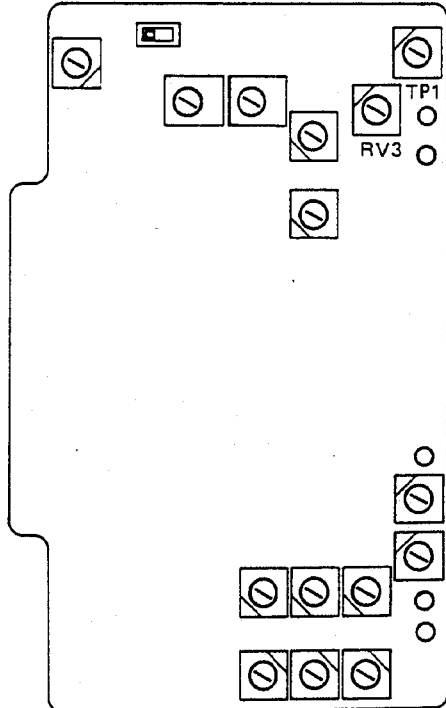
#### FRONT PANEL (R)



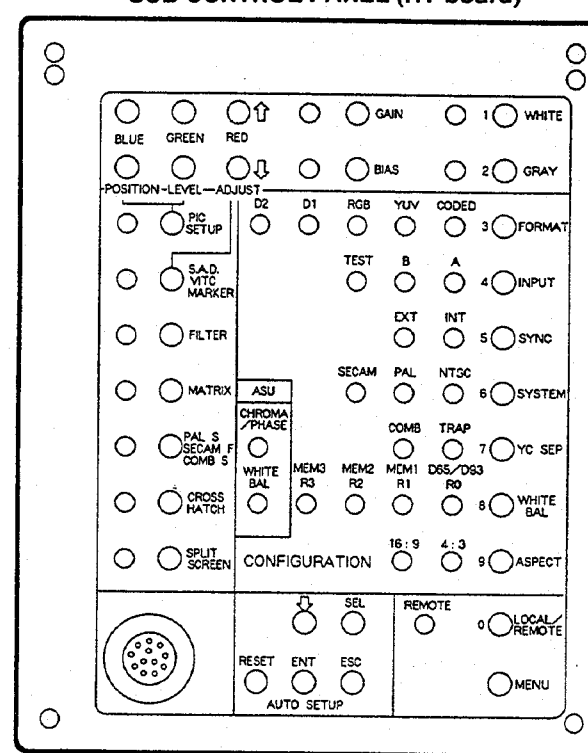
#### BA board



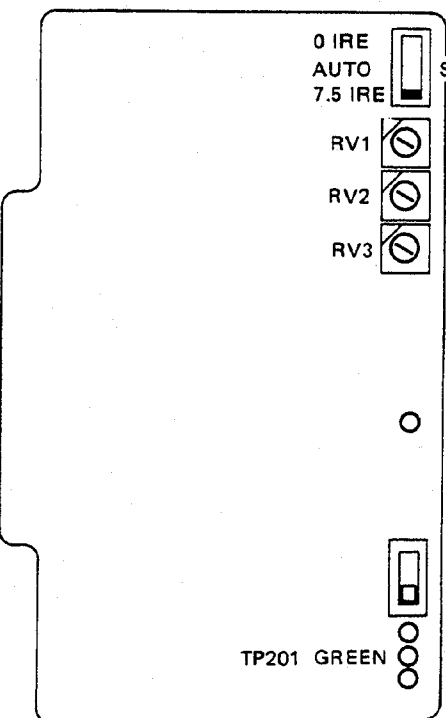
#### BG board



#### SUB CONTROL PANEL (HY board)

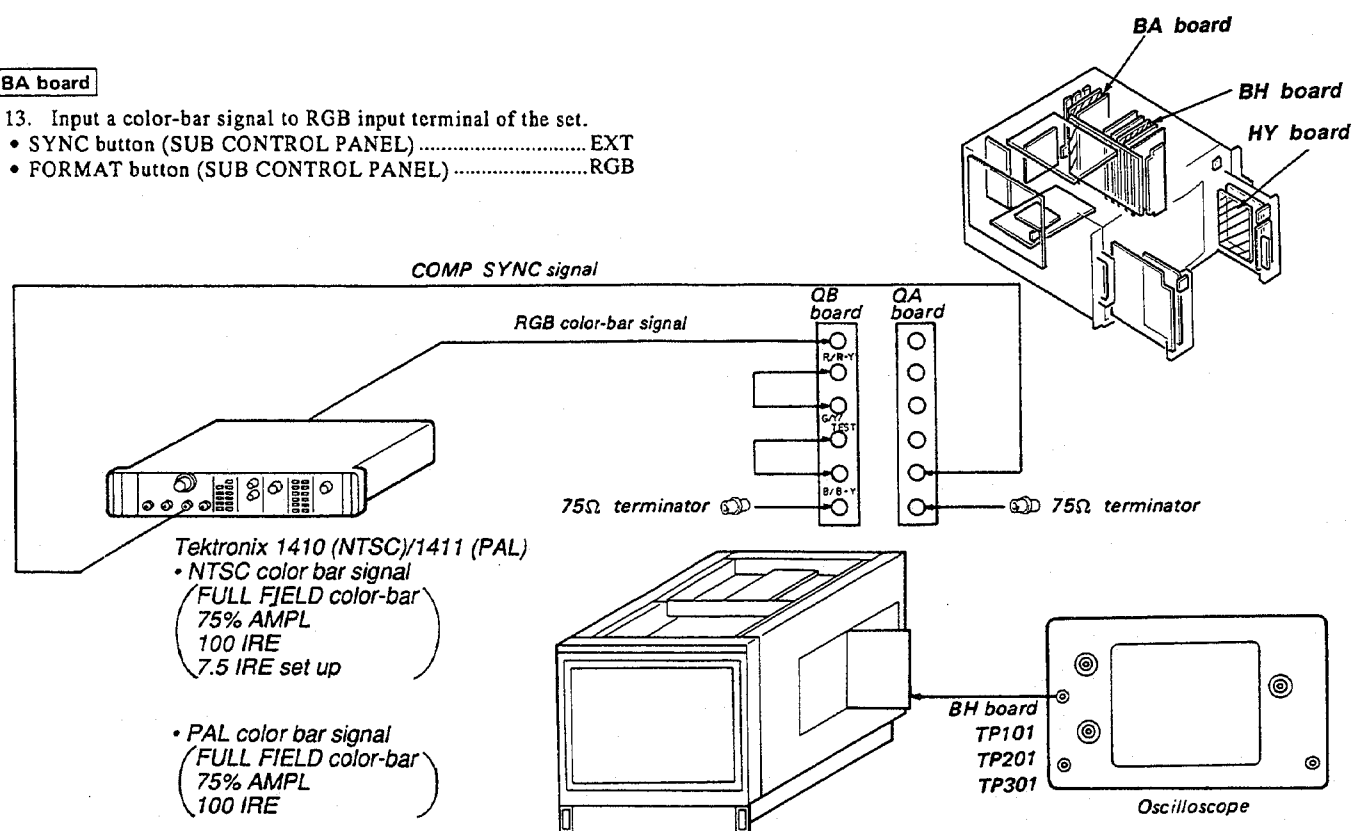


#### BH board

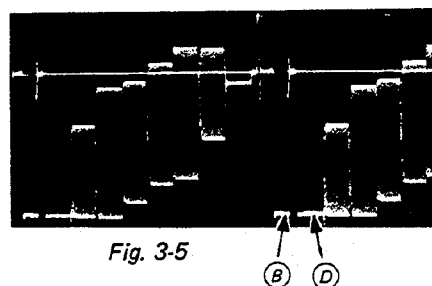


# BA board

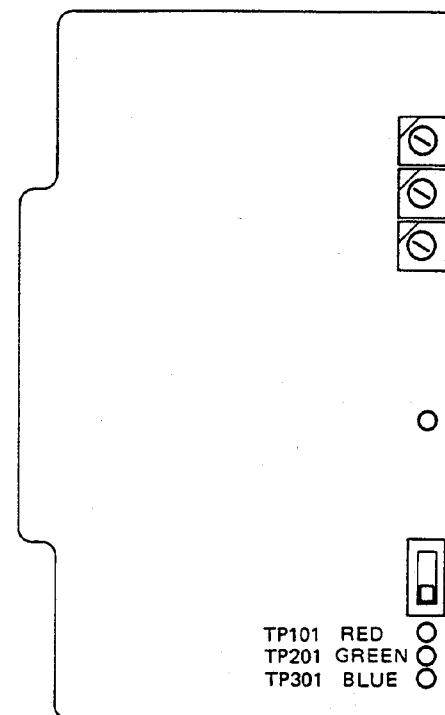
13. Input a color-bar signal to RGB input terminal of the set.
  - SYNC button (SUB CONTROL PANEL) ..... EXT
  - FORMAT button (SUB CONTROL PANEL) ..... RGB



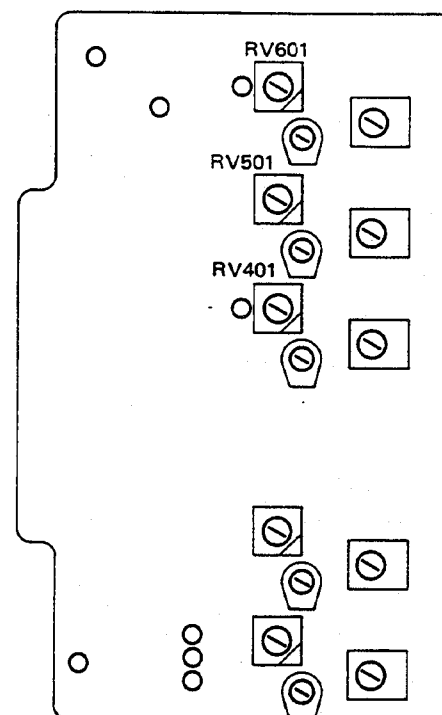
14. Connect an oscilloscope to TP101 of BH board.
15. Adjust RV401 of BA board so that the ① (100 IRE level) coincides with ② (100% white level) as shown in Fig. 3-5.
16. Connect an oscilloscope to TP201 of BH board.
17. Adjust RV501 of BA board so that the ① (100 IRE level) coincides with ② (100% white level) as shown in Fig. 3-5.
18. Connect an oscilloscope to TP101 of BH board.
19. Adjust RV601 of BA board so that the ① (100 IRE level) coincides with ② (100% white level) as shown in Fig. 3-5.



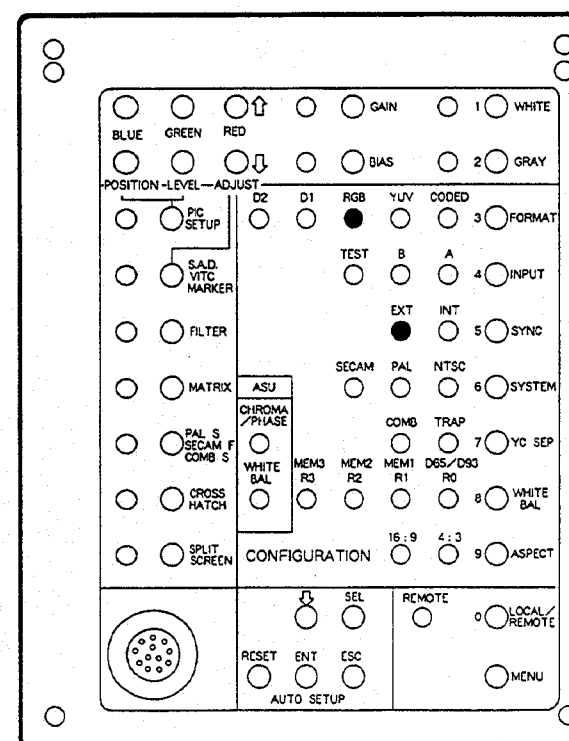
# BH board



# BA board



# SUB CONTROL PANEL (HY board)



#### 4. BA Board INPUT CIRCUIT FREQUENCY CHARACTERISTIC ADJUSTMENT

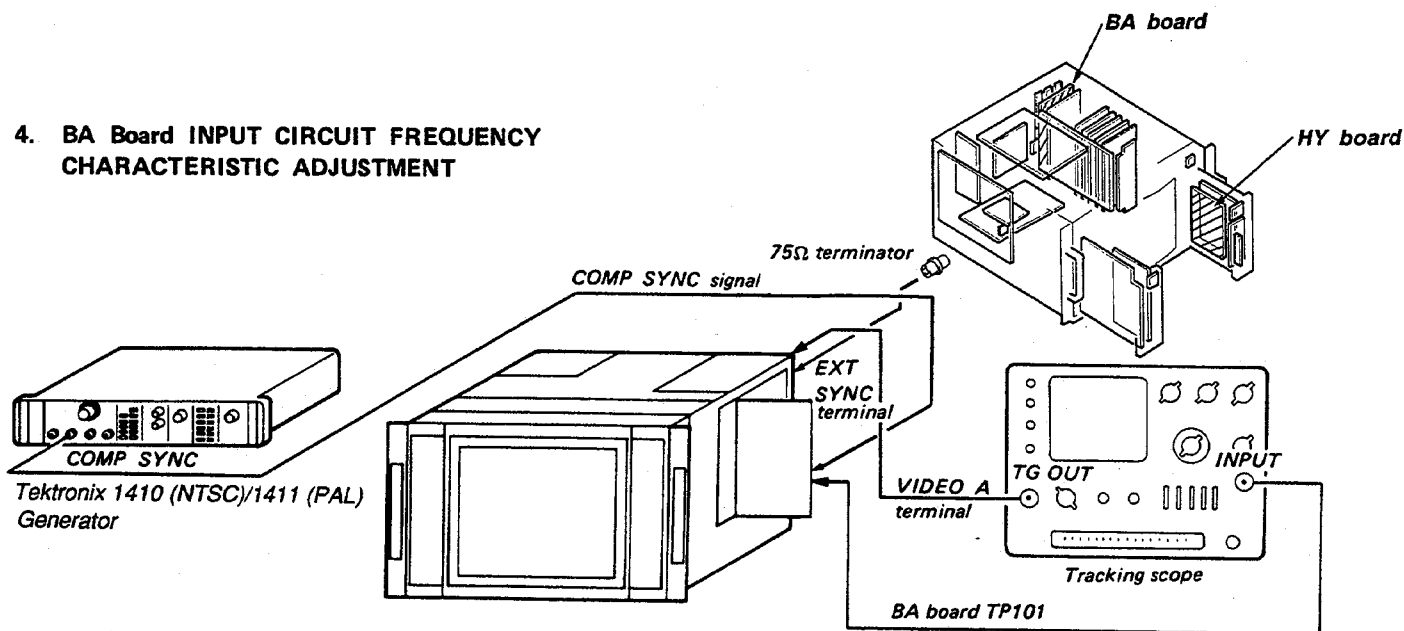


Fig. 4-1

- Complete the connection as shown in Fig 4-1.
  - FORMAT selector ..... CODED
  - INPUT selector (SUB CONTROL PANEL) ..... A
  - SYNC button (SUB CONTROL PANEL) ..... EXT
  - CONTRAST control (FRONT PANEL (R)) ..... Minimum
  - BRIGHTNESS control (FRONT PANEL (R)) ..... Minimum
- Adjust CV101 of the BA board so that minimum as shown in Fig. 4-2.

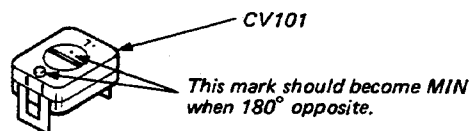


Fig. 4-2

- Adjust output waveform peak to 12MHz with CV102 of the BA board as shown in Fig. 4-3.

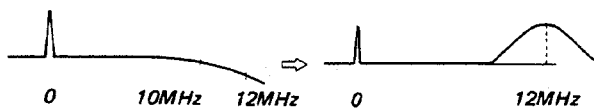


Fig. 4-3

- Adjust CV101 of the BA board so that the output waveform becomes flat in a range of 0 to 10MHz as shown in Fig. 4-4.

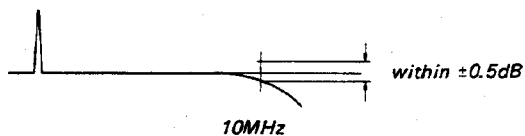
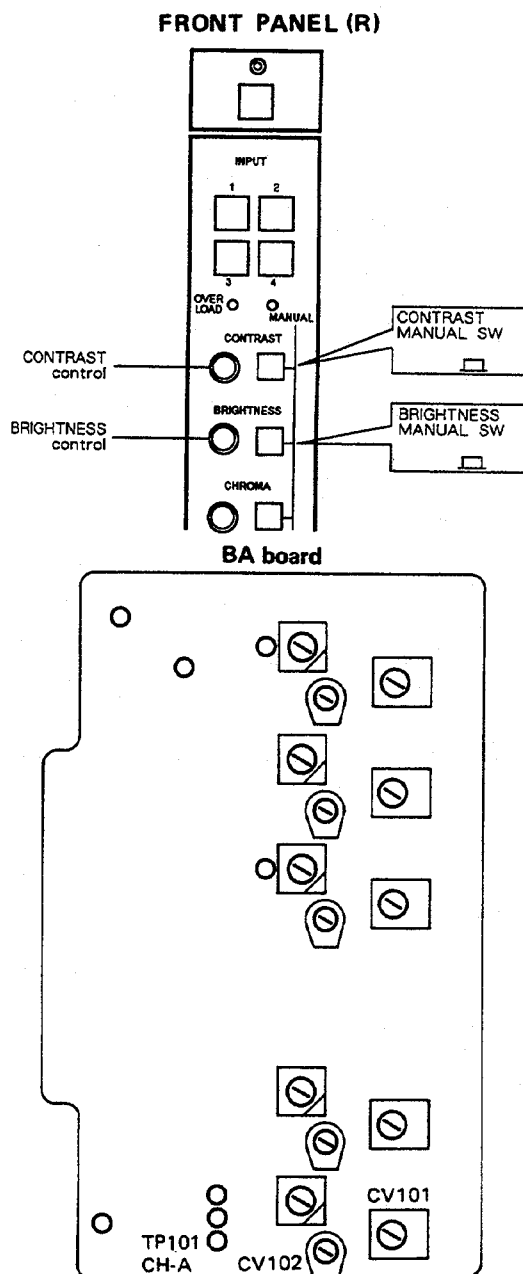


Fig. 4-4

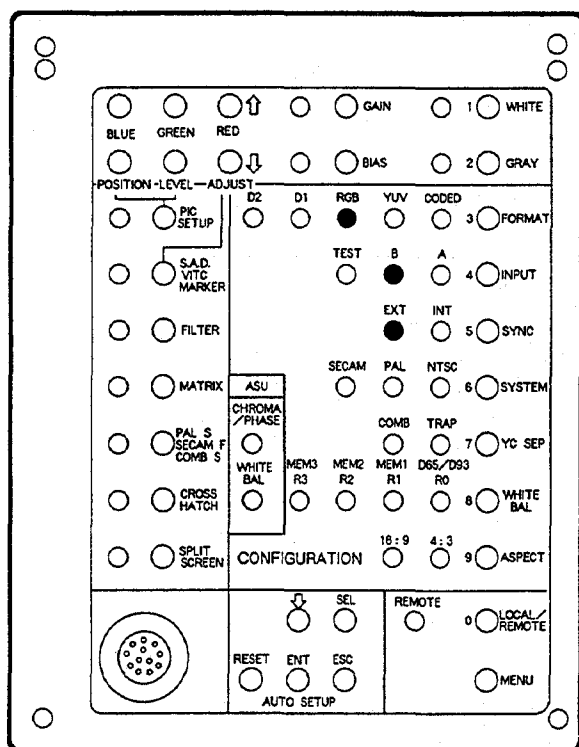




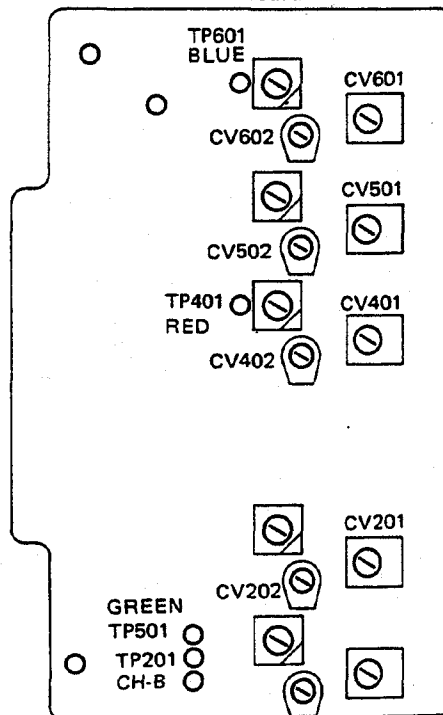
5. In the same way, perform the adjustment under the following conditions.

INPUT	INPUT button	FORMAT button	TP (BA board)	CV (BA board)
	(SUB CONTROL PANEL)			
B	B	CODED	TP201	CV201, 202
R/R-Y		RGB	TP401	CV401, 402
G/Y/TEST		RGB	TP501	CV501, 502
B/B-Y		RGB	TP601	CV601, 602

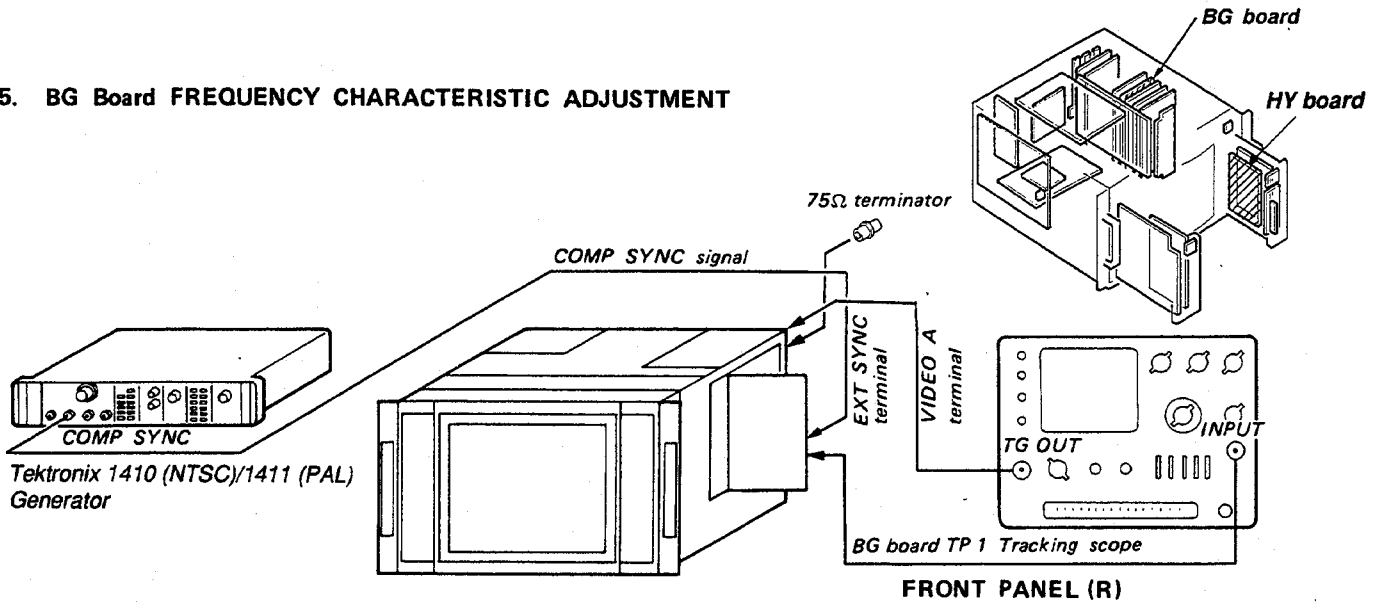
SUB CONTROL PANEL (HY board)



BA board



## 5. BG Board FREQUENCY CHARACTERISTIC ADJUSTMENT



- Complete the connection as shown in Fig 5-1.
  - SYNC button (SUB CONTROL PANEL)..... EXT
  - CONTRAST control ..... Minimum
  - BRIGHTNESS control ..... Minimum
  - S1 (BG Board) ..... 4.5MHz (4.5 6.5)
- Adjust RV1, CV2 and CV3 of the BG board so that the output waveform becomes flat in a range of 0 to 10MHz as shown in Fig. 5-2. (within  $0 \pm 0.5\text{dB}$ )

\*Waveform movement by RV1, CV2, CV3

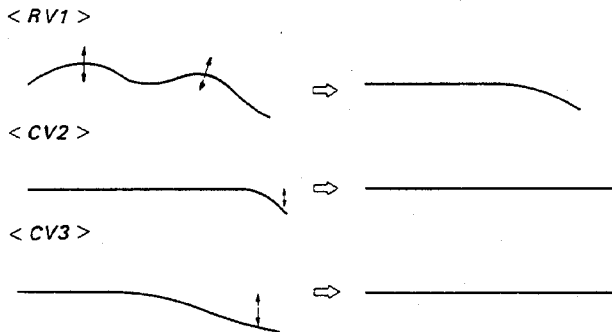


Fig. 5-2

- Adjust with RV2 (BG board) to the position in which the APT (Fig. 5-3.) begins to become effective.

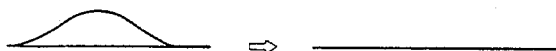
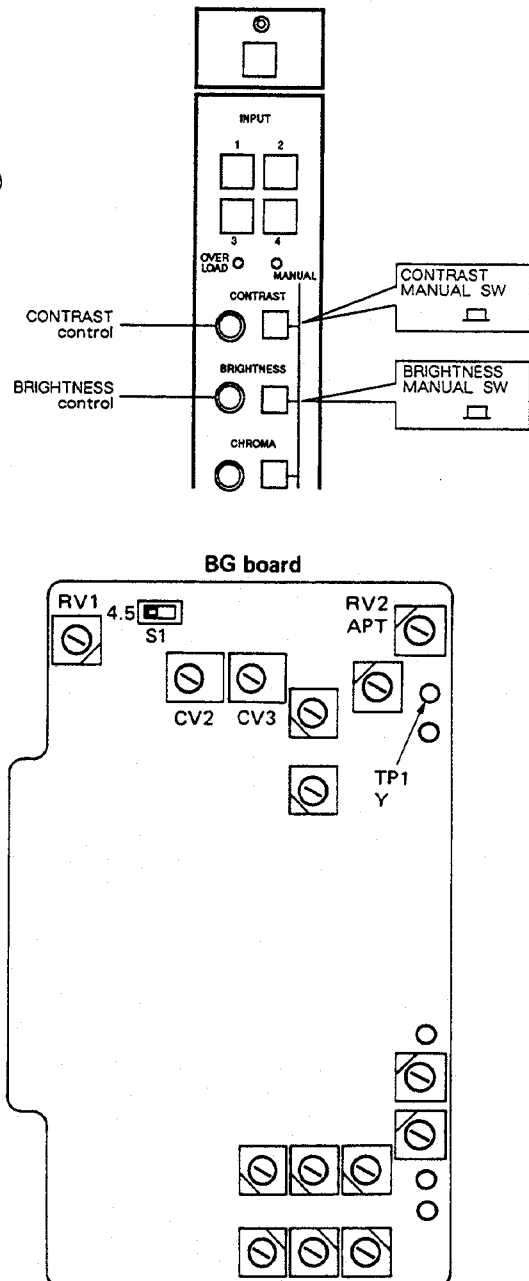


Fig. 5-3



## 6. COMPONENT INPUT LEVEL ADJUSTMENT

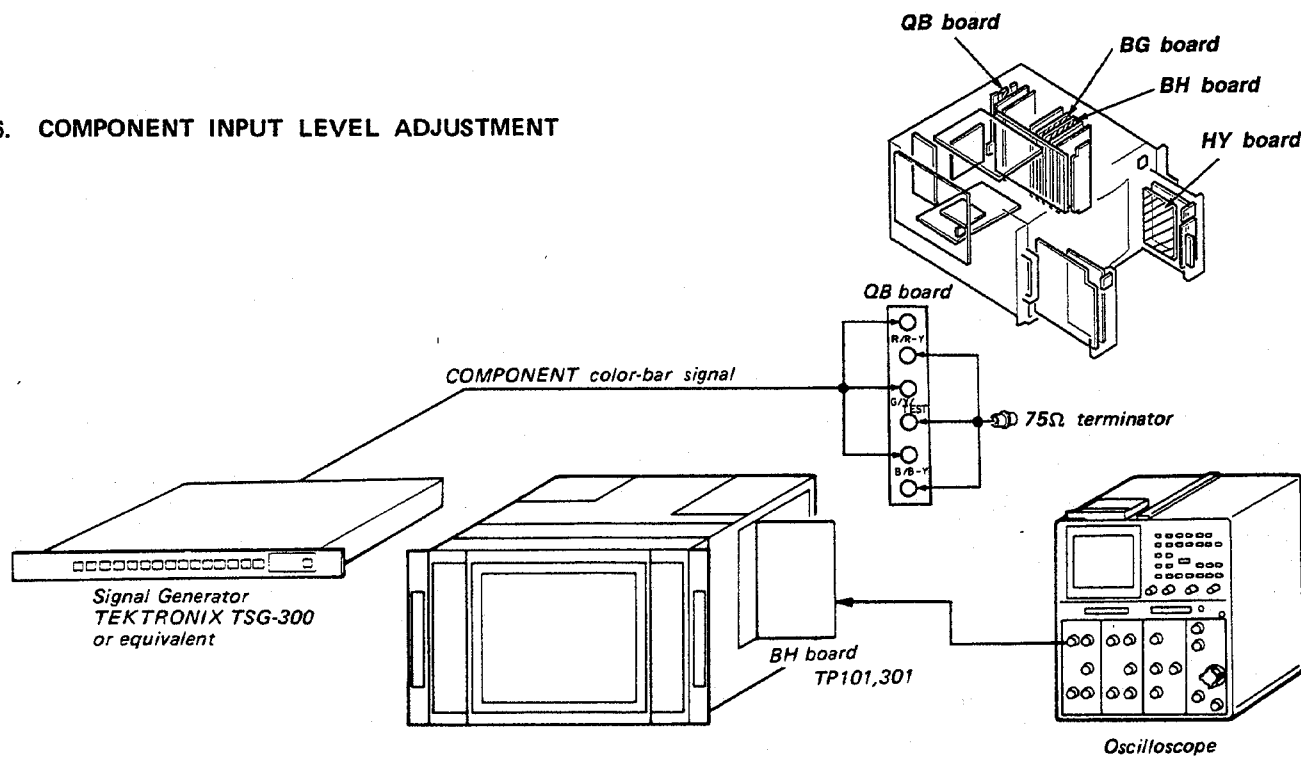
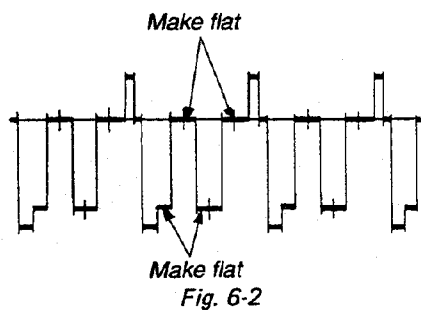
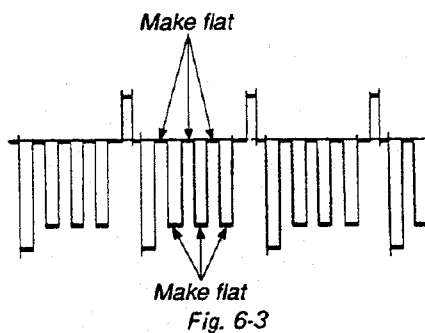


Fig. 6-1

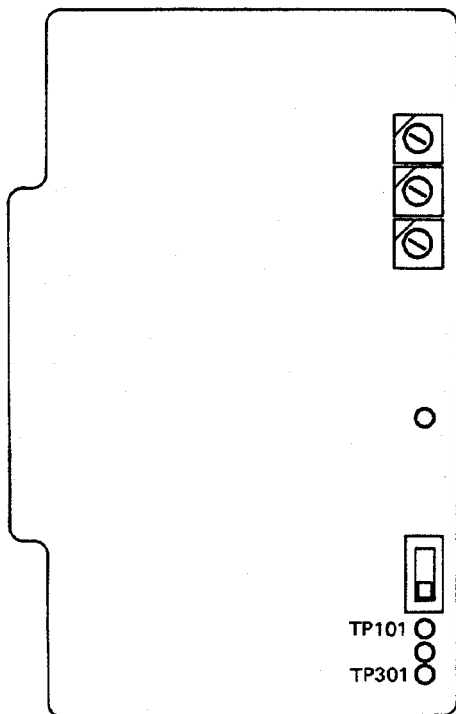
1. Complete the connections as shown in Fig. 6-1.
  - **FORMAT** button (SUB CONTROL PANEL) ..... YUV
2. Connect an oscilloscope to the TP-101 of BH board.
3. Adjust RV21 of BG board so that the output waveform becomes flat. (Fig. 6-2)



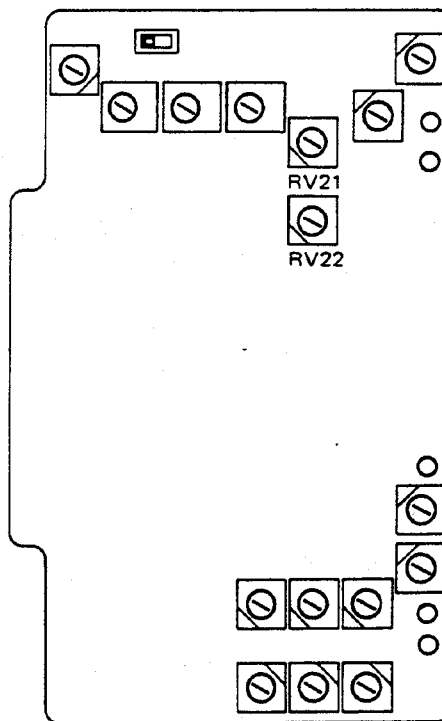
4. Connect an oscilloscope to the TP301 of BH board.
5. Adjust RV22 of BG board so that the input waveform becomes flat. (Fig. 6-3)



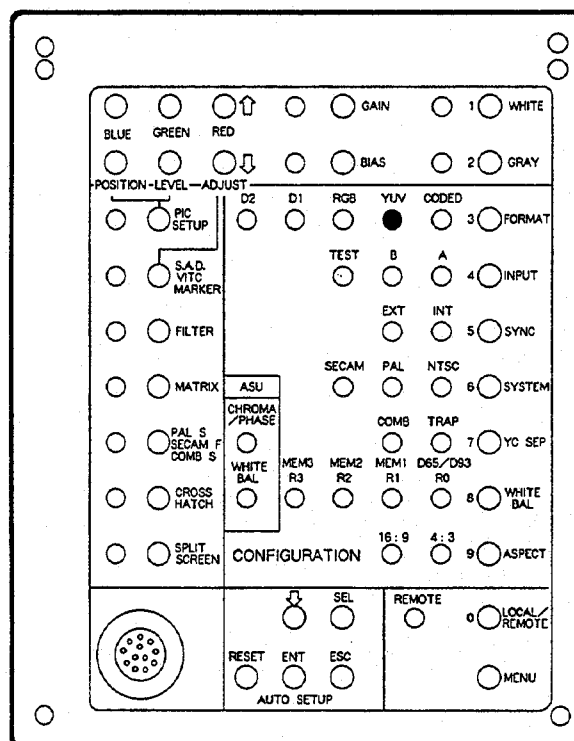
BH board



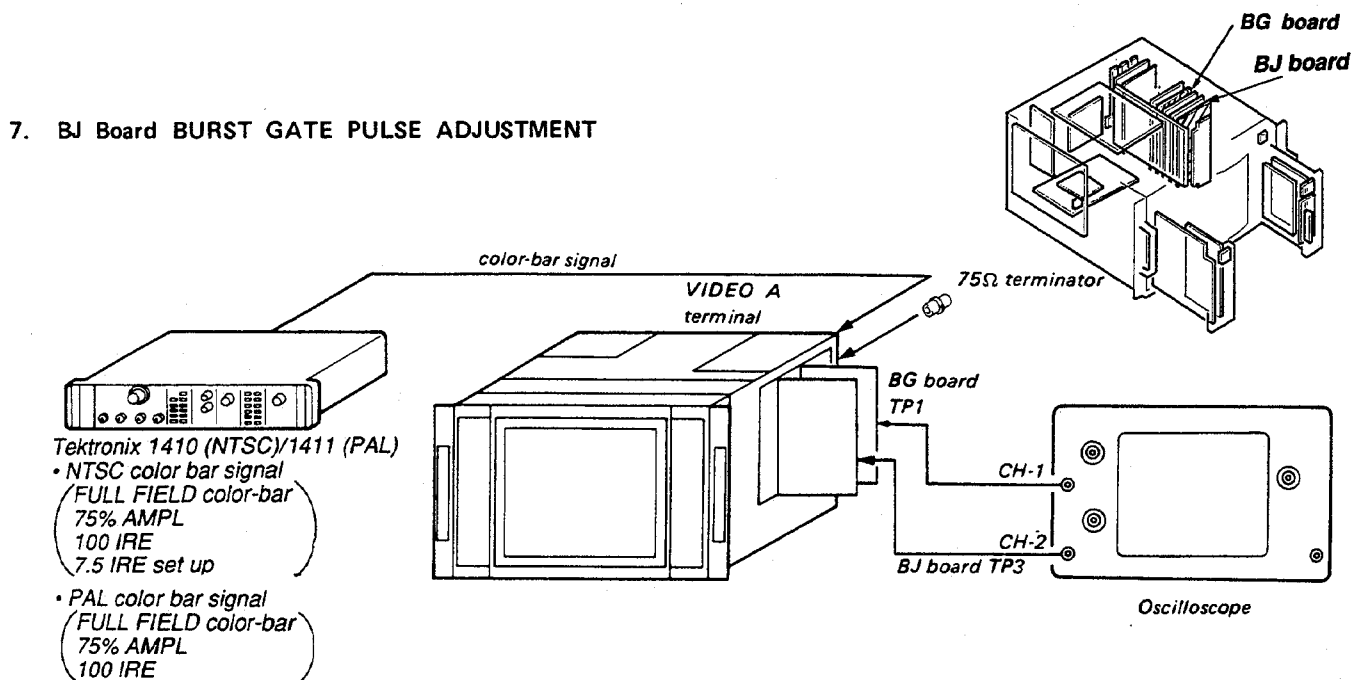
BG board



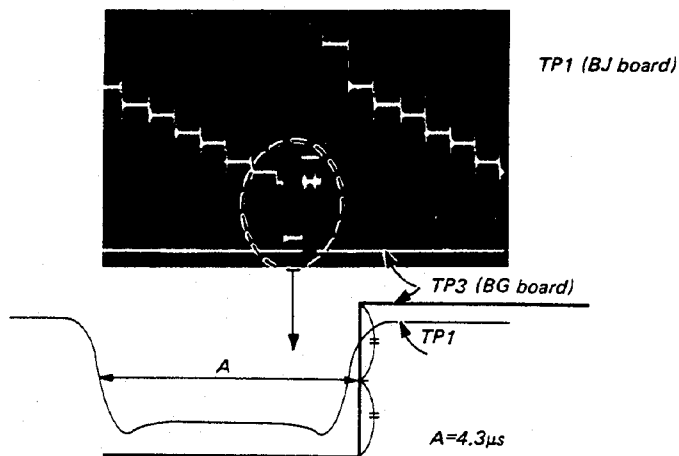
SUB CONTROL PANEL (HY board)



## 7. BJ Board BURST GATE PULSE ADJUSTMENT



1. Input a color-bar signal to the VIDEO A terminal of the set.
2. Connect an oscilloscope (CH-1 probe) to the TP1 of BG board and connect an oscilloscope (CH-2 probe) to the TP3 of BJ board.
3. Adjust RV8 of BJ board so that the A is  $4.3\mu\text{s}$  as shown in Fig. 7-1.



\* Adjust (A), from SYNC fall to B.G.P. (BURST GATE PULSE) rise, to  $4.3\mu\text{s}$ .

Fig. 7-1

4. Adjust RV4 of BJ board so that the burst gate pulse width is  $3.9\mu\text{s}$  as shown in Fig. 7-2.

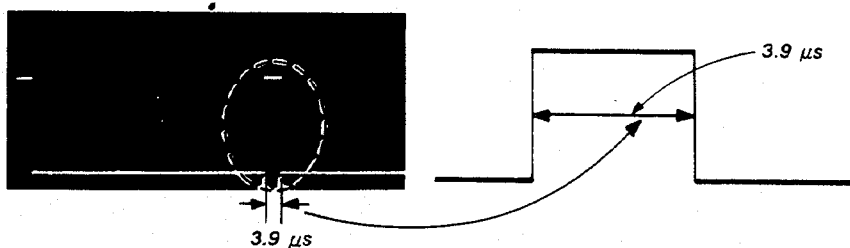
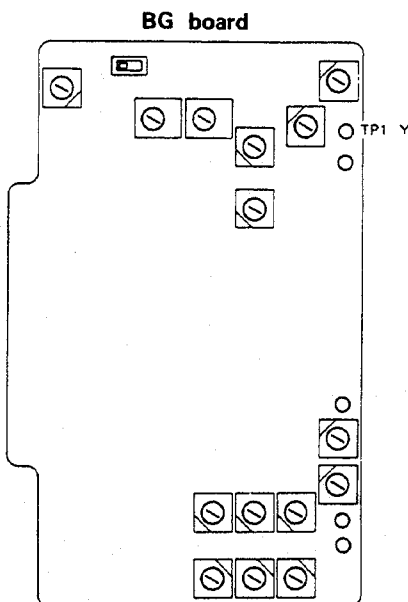
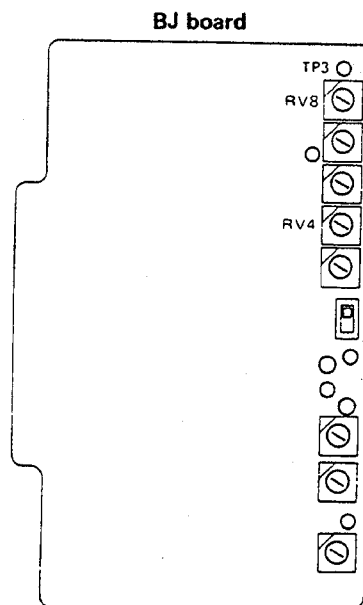
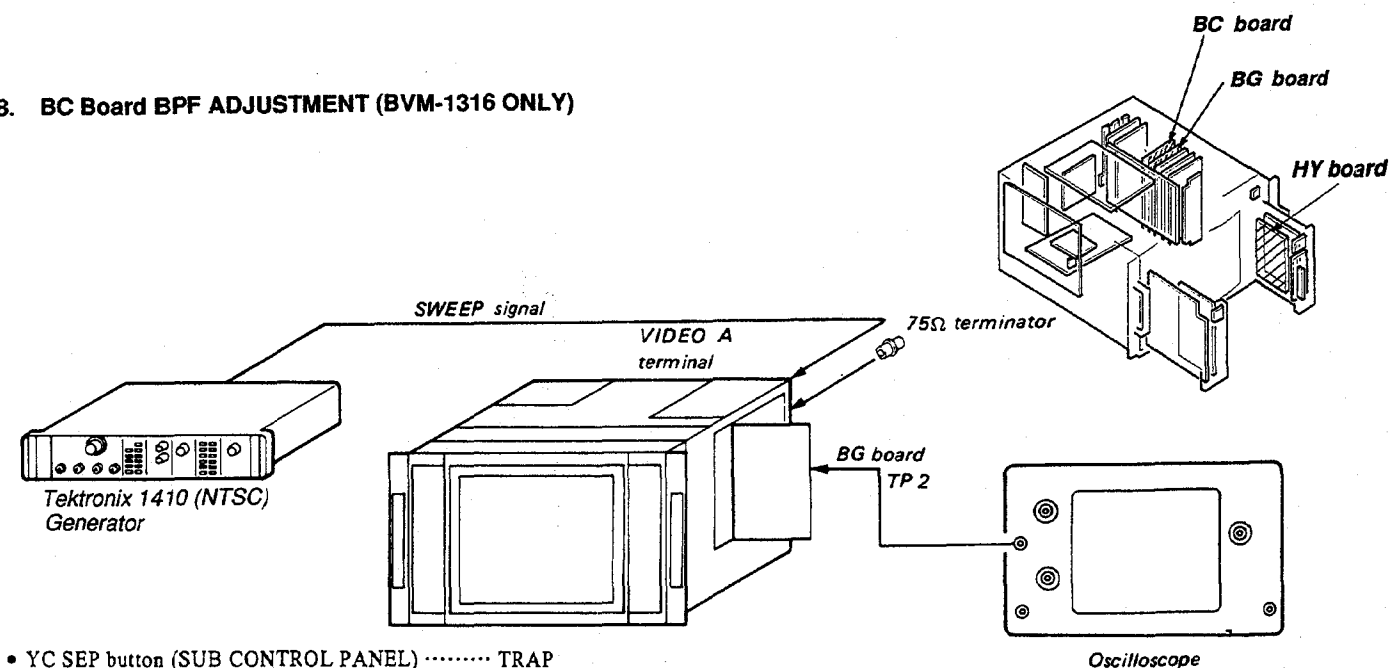


Fig. 7-2



# 8. BC Board BPF ADJUSTMENT (BVM-1316 ONLY)



• YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input SWEEP signal to the VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP2 on the BG board.
3. Make the V/dw of oscilloscope into VARIABLE, and match the upper section of waveform to 7 div as shown in Fig. 8-1.

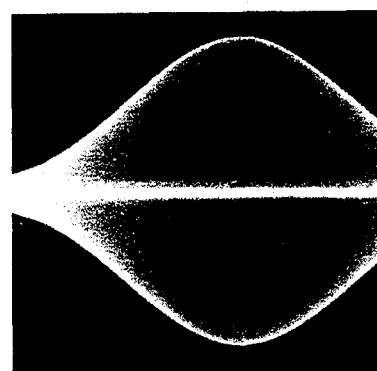
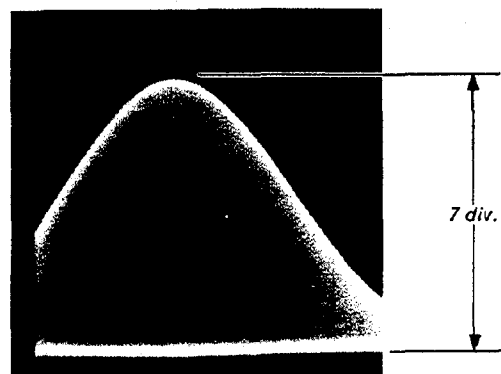


Fig. 8-1



4. Adjust L3 on the BC board so that A is equal to B as shown in Fig. 8-2.

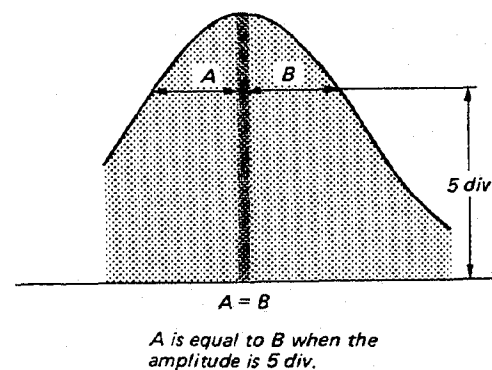
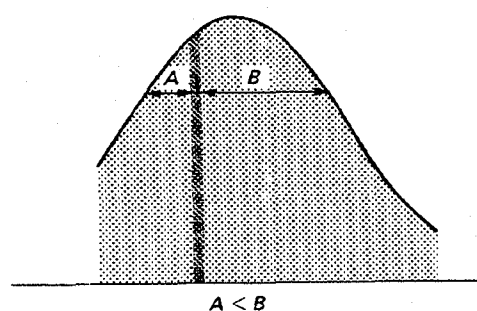
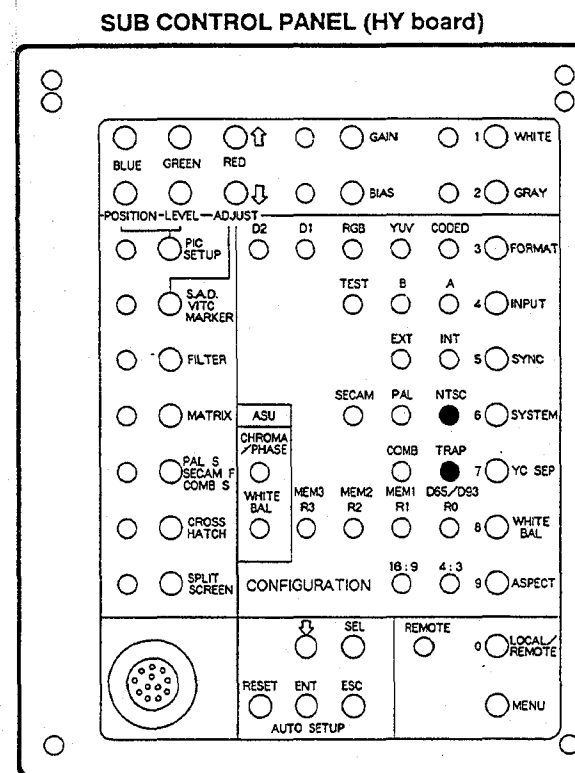
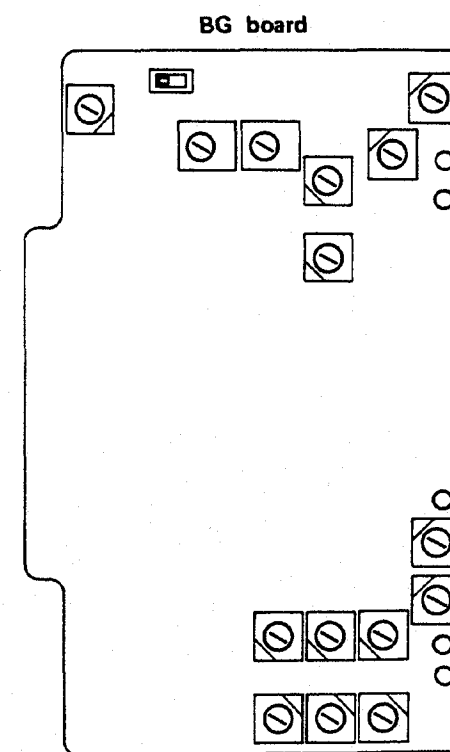
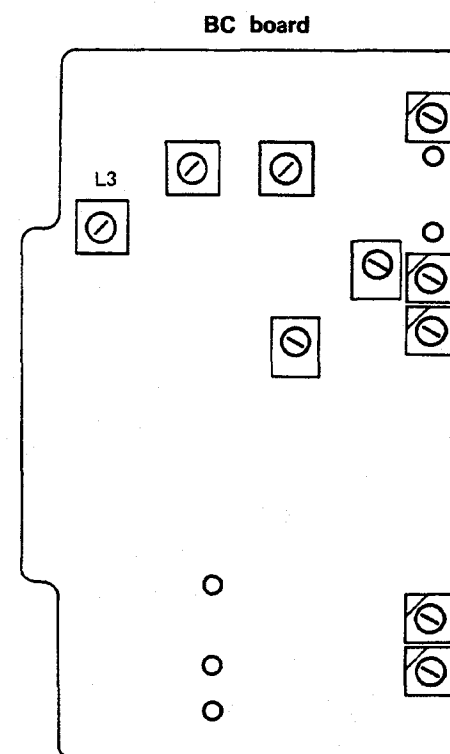


Fig. 8-2



# 9. BC Board PHASE SHIFT ADJUSTMENT (BVM-1316 ONLY)

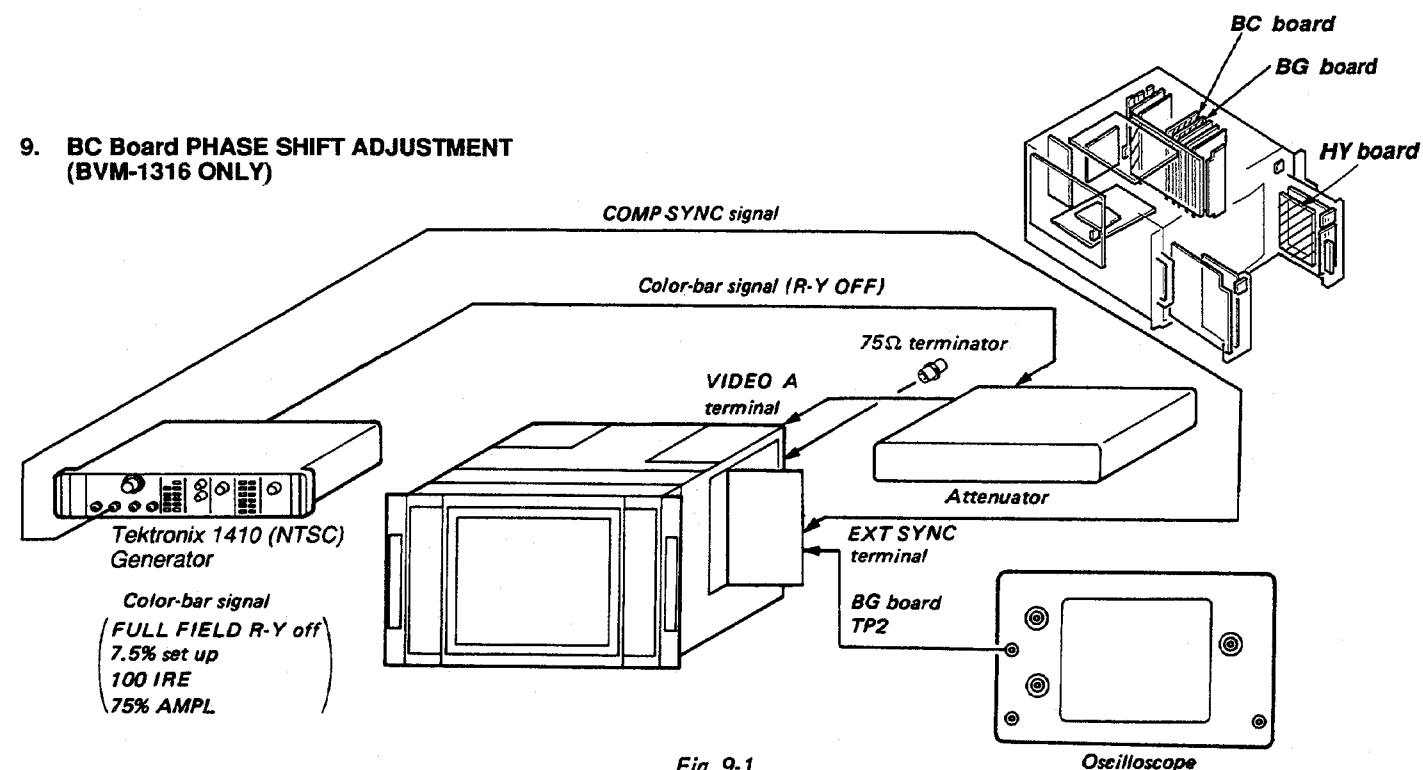


Fig. 9-1

- Complete the connection as shown in Fig 9-1.
  - COLOR SYSTEM (SUB CONTROL PANEL)..... NTSC
  - FORMAT button (SUB CONTROL PANEL)..... CODED
  - YC SEP button (SUB CONTROL PANEL)..... TRAP
  - SYNC button (SUB CONTROL PANEL)..... EXT
- Connect an oscilloscope to the TP2 on the BG board.
- Make the waveform flat with the PHASE control of front panel as shown in Fig. 9-2.

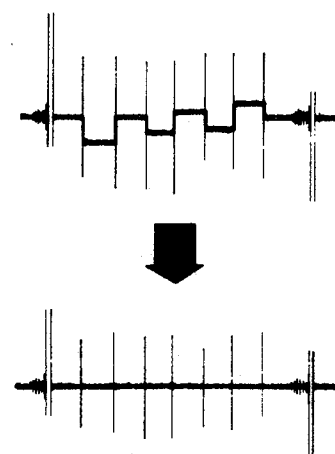
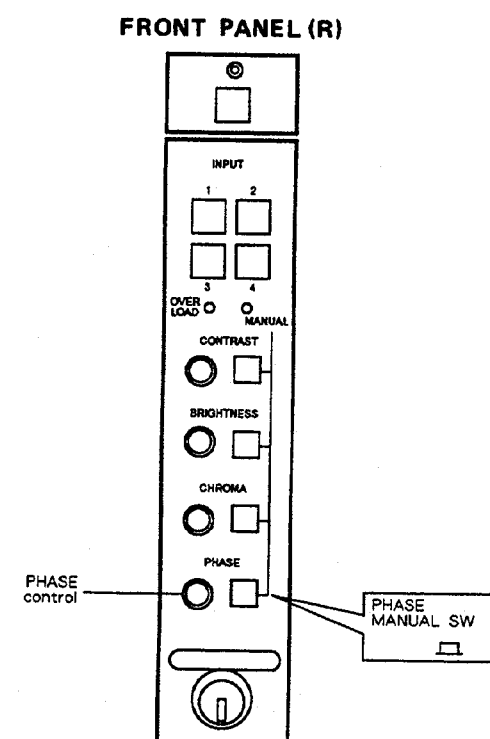
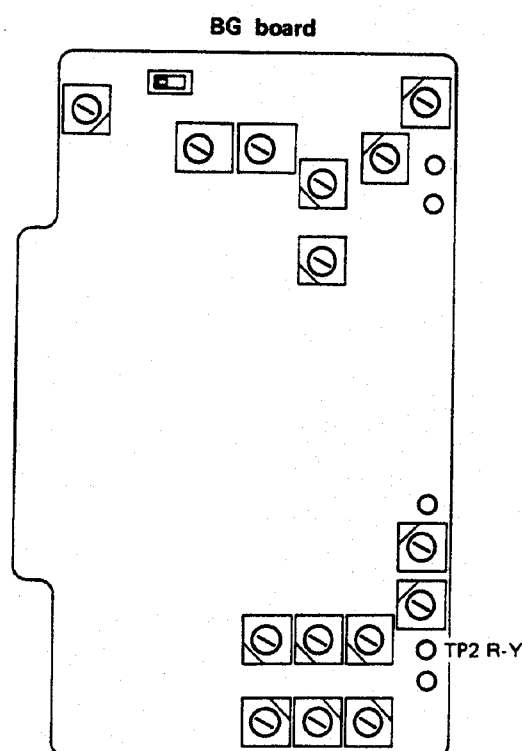
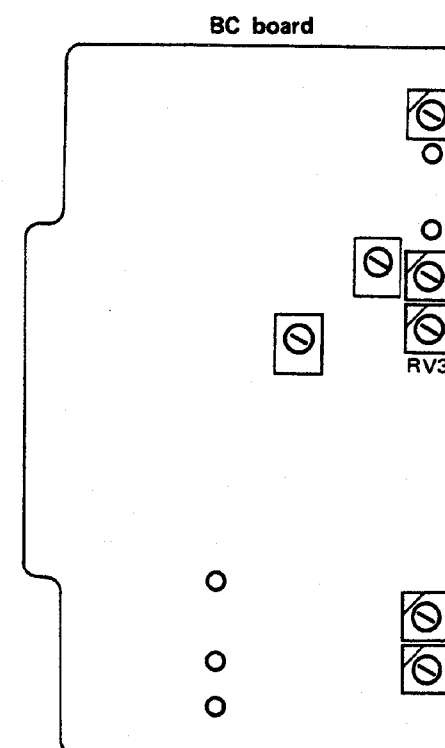


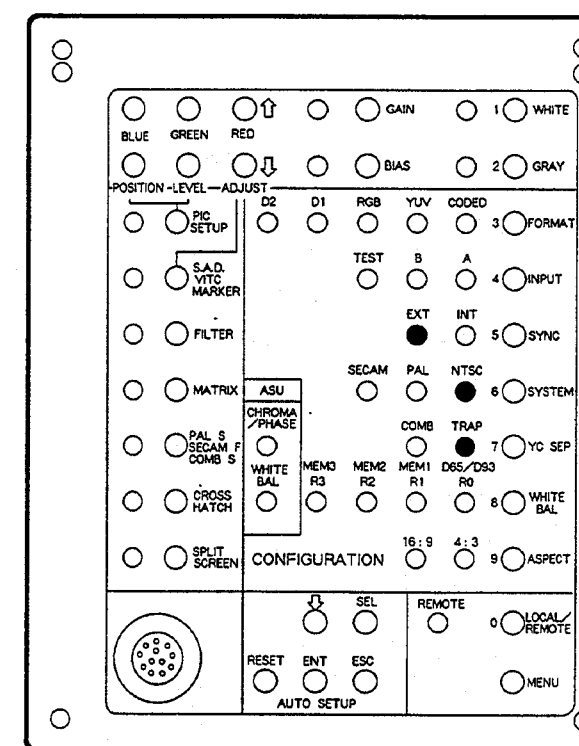
Fig. 9-2



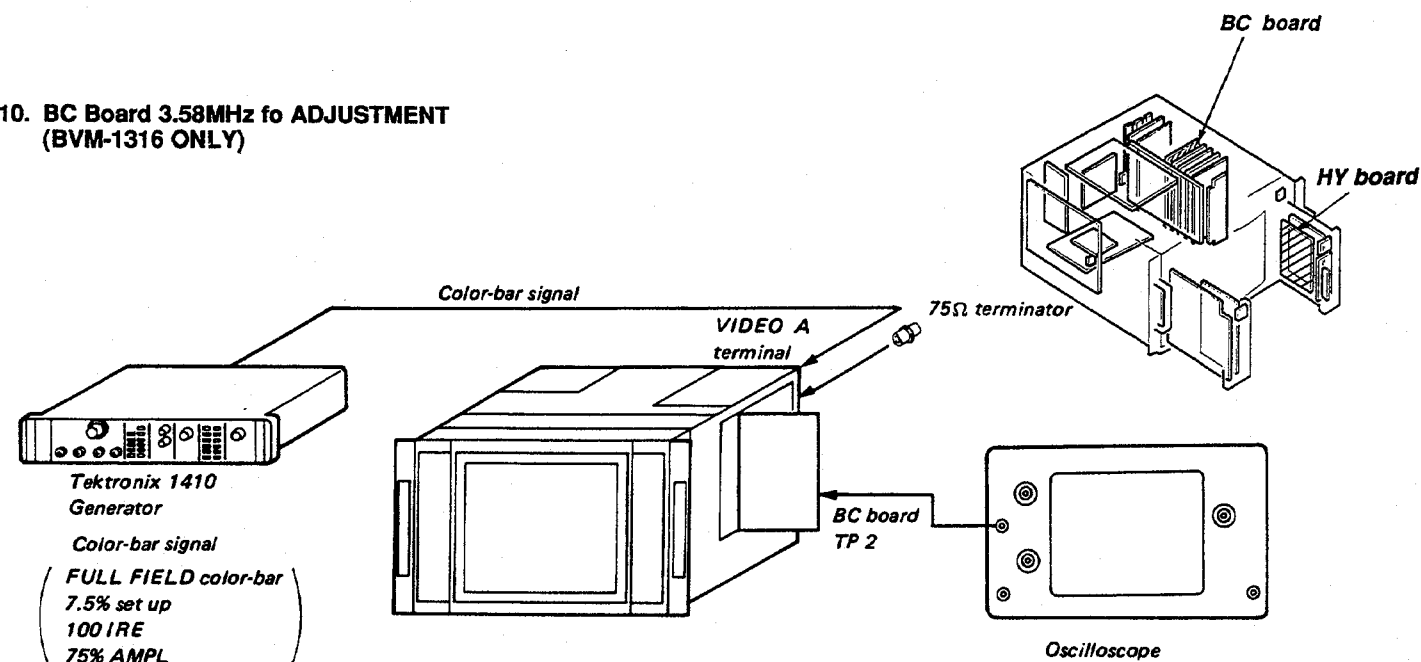
- Attenuate the signal by 10dB by using attenuator.
- Adjust RV3 on the BC board so that the output waveform becomes flat as shown in Fig. 9-2.
- Restore the attenuator to 0dB.
- Repeat the steps 3 to 5.



## SUB CONTROL PANEL (HY board)



# 10. BC Board 3.58MHz fo ADJUSTMENT (BVM-1316 ONLY)



- YC SEP button (SUB CONTROL PANEL) ..... TRAP
- 1. Input color-bar signal to the VIDEO A terminal of the set.
- 2. Connect an oscilloscope to the TP2 of BC board.
- 3. Short-circuit between TP ⑥ and ⑦ of BC board with a jumper wire.
- 4. Adjust CV2 of BC board so that the output waveform is shifted slowly as shown in Fig. 10-1.
- 5. Turn off the power of this monitor, and disconnect TP ⑥ and ⑦ of BC board.

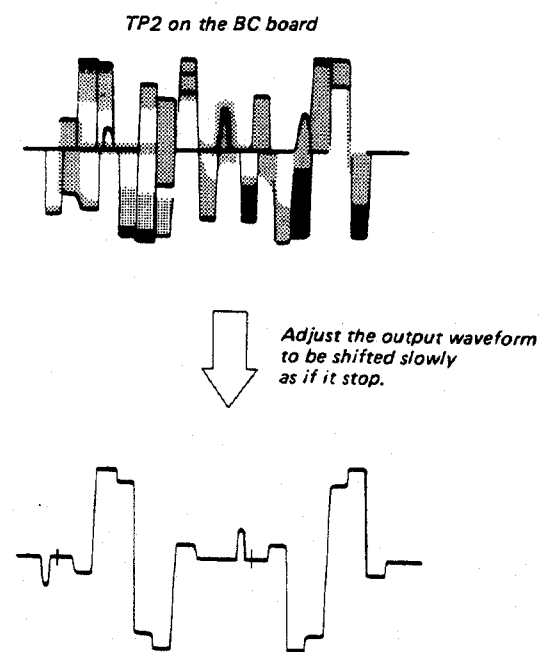
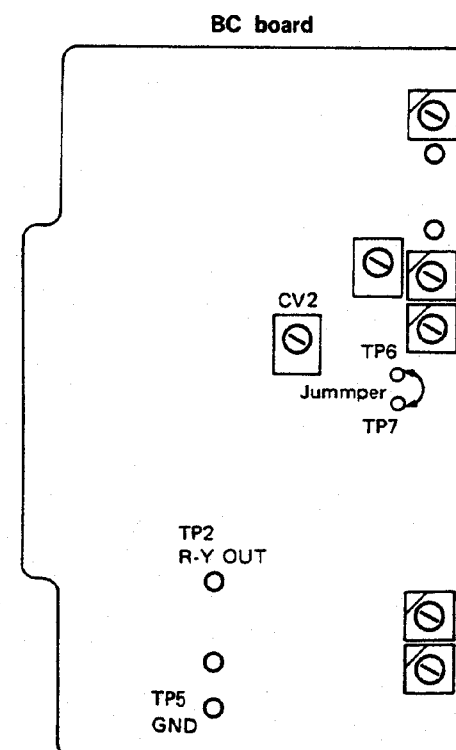
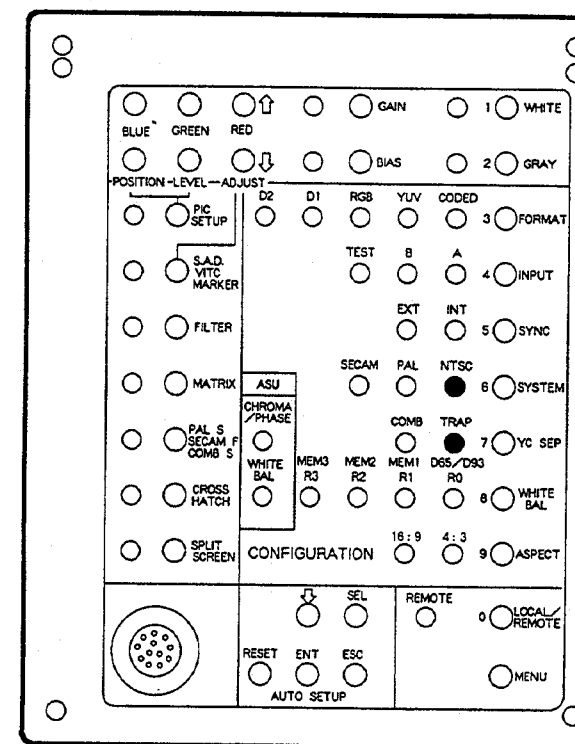


Fig. 10-1

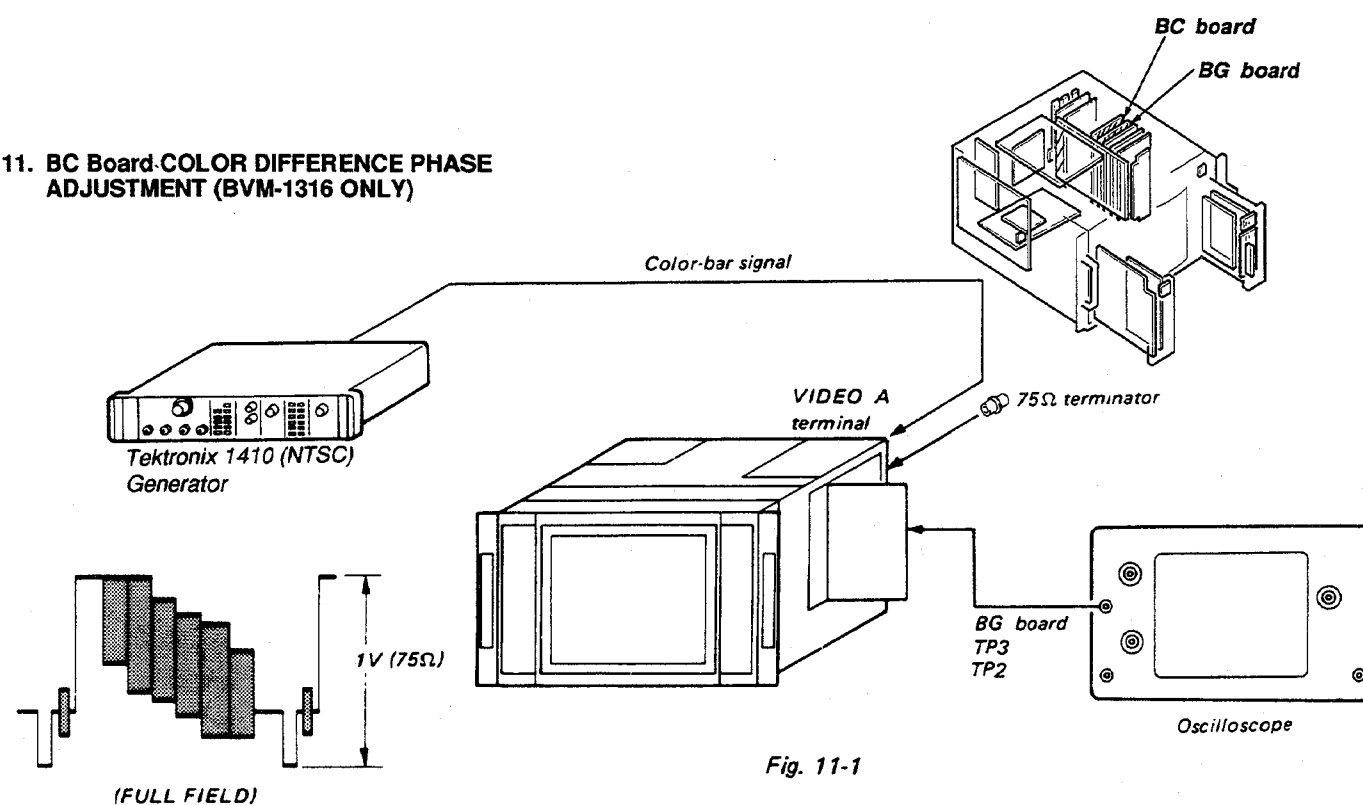


## SUB CONTROL PANEL (HY board)



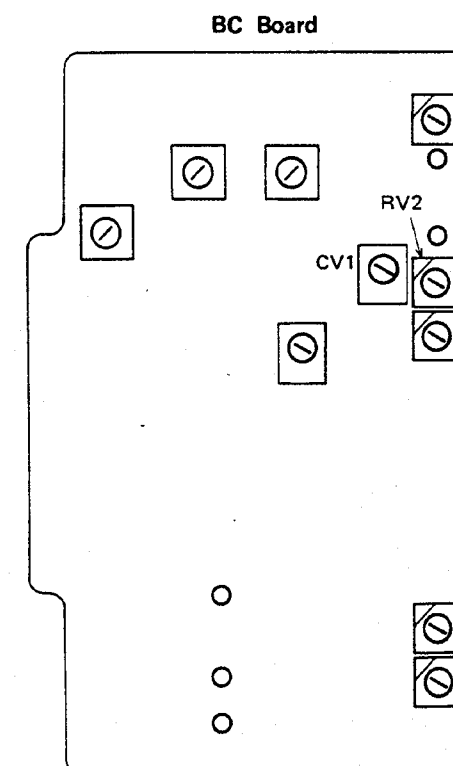
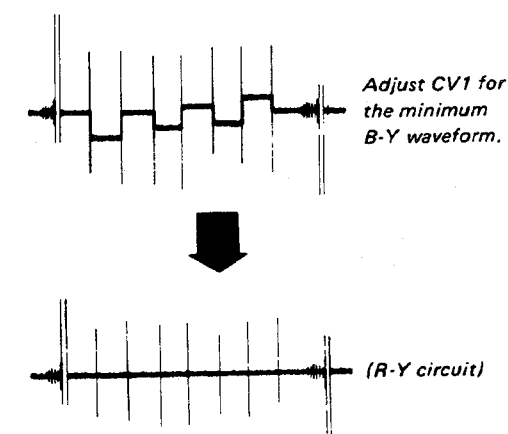


# 11. BC Board COLOR DIFFERENCE PHASE ADJUSTMENT (BVM-1316 ONLY)

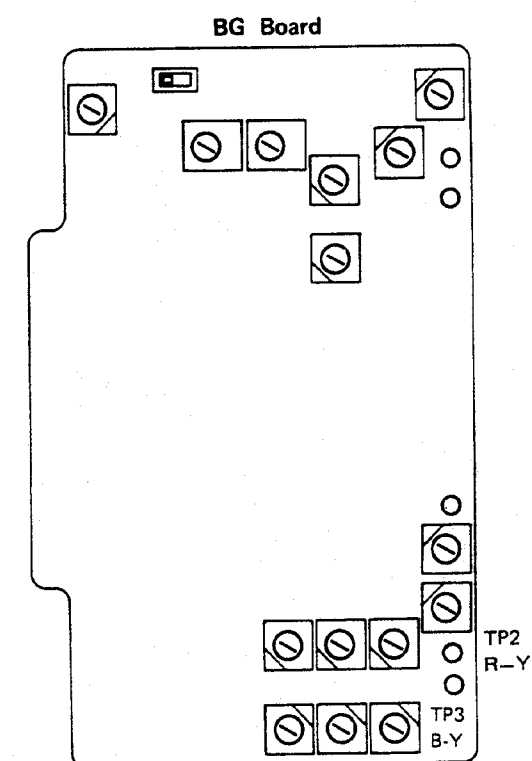
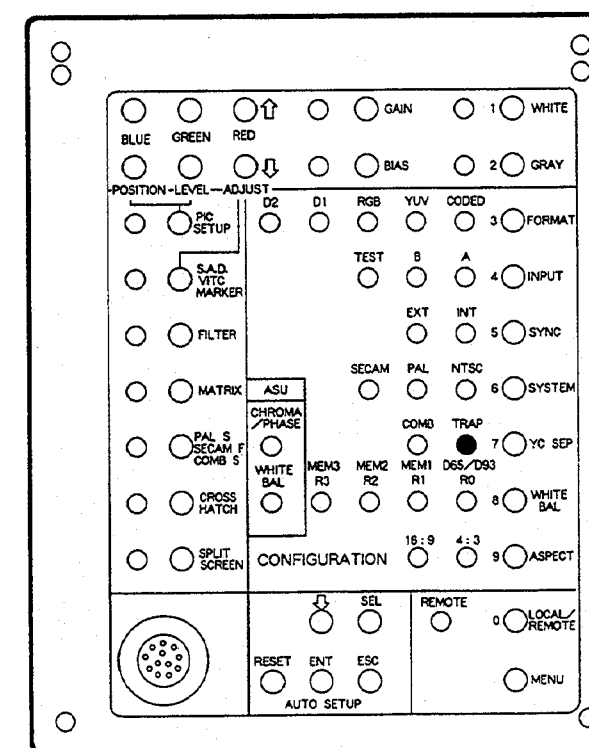


## Quad Adjustment

- Connect the oscilloscope probe to TP2 on the BG board. Turn on the B-Y signal of the signal generator, and turn off the (R-Y) signal. Then adjust CV1 on the BC board so that the output waveform is flat. (See Fig. 11-3)
- Repeat the steps 3 to 6.



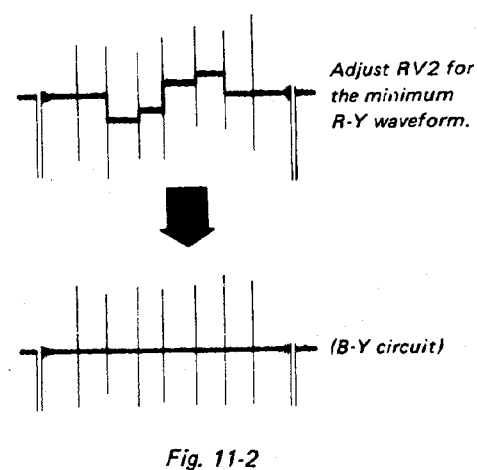
## SUB CONTROL PANEL (HY board)



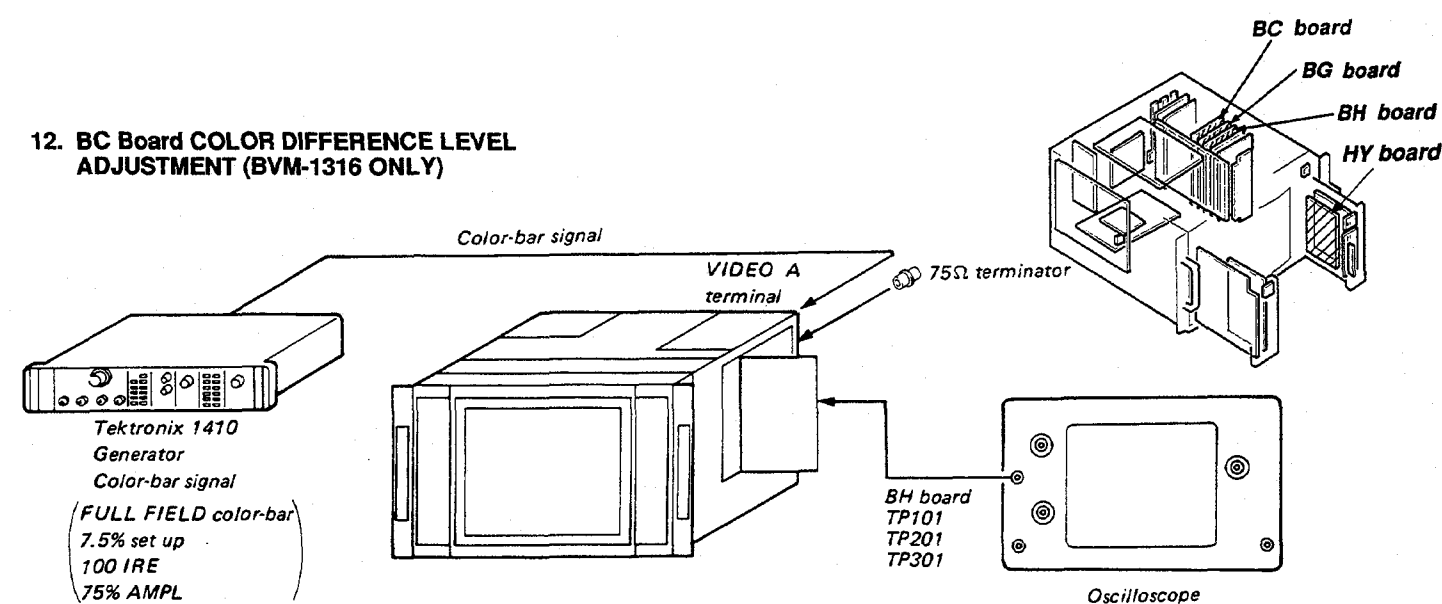
- Complete the connections as shown in Fig. 11-1.
- Turn on the power of this monitor.

## B-Y System Adjustment

- Connect the oscilloscope probe to TP3 on the BG board, and turn off the (B-Y) signal of the signal generator.
- Set the oscilloscope sensitivity to 20mV/DIV, and adjust RV2 on the BC board so that the output waveform is flat. (See Fig. 11-2.)

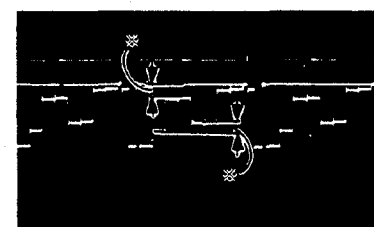


## 12. BC Board COLOR DIFFERENCE LEVEL ADJUSTMENT (BVM-1316 ONLY)



• YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input color-bar signal to the VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP101 of BH board.
3. Eliminate interval in the output waveform (mark \* in Fig. 12-1) with RV4.

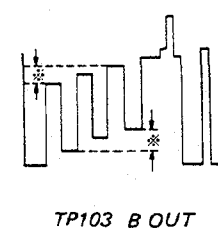


TP101 R OUT

Fig. 12-1

\* Bring \* marked levels to zero respectively with RV4 on the BC board.

4. Connect an oscilloscope to the TP301 of BH board.
5. Adjust RV5 of BC board so that the output waveform as shown in Fig. 12-2.



TP103 B OUT

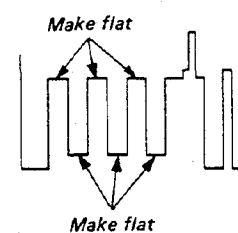
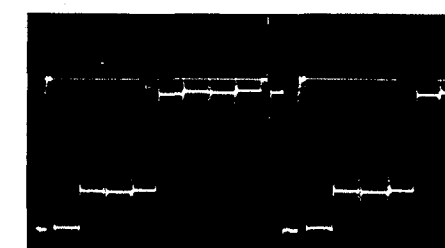


Fig. 12-2

6. Connect an oscilloscope to the TP201 of BH board.
7. Adjust RV4 and RV5 of BG board so that the INPUT waveform becomes flat as shown in Fig. 12-3.



TP201 G OUT

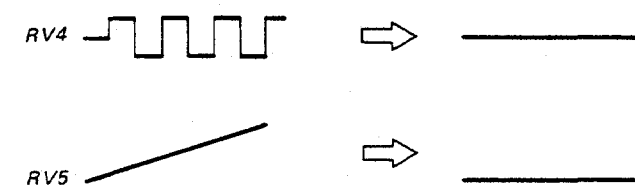
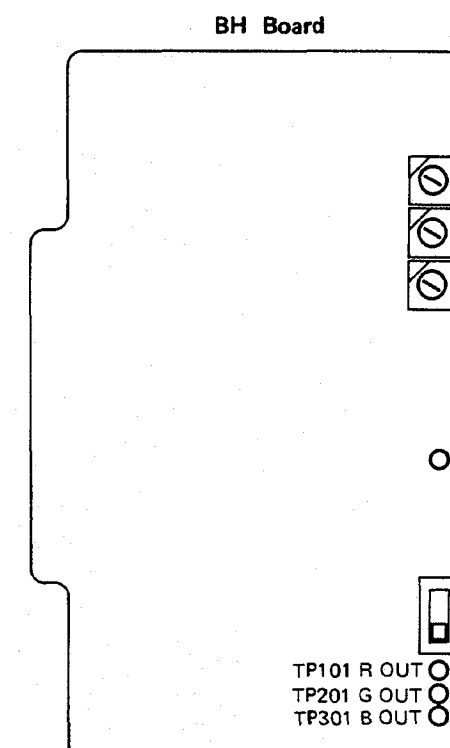
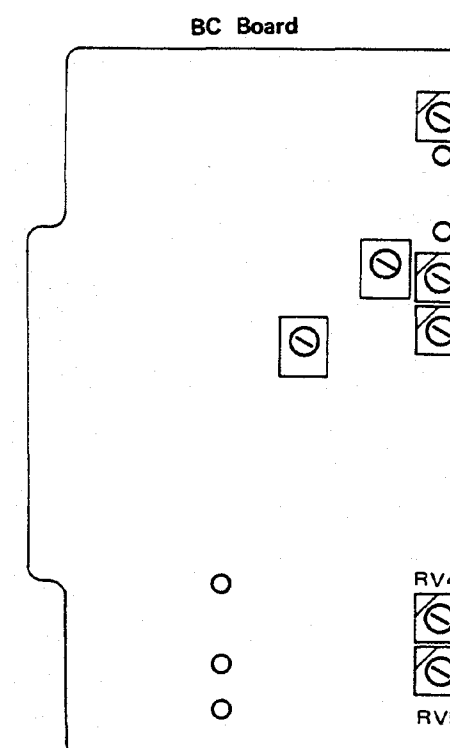
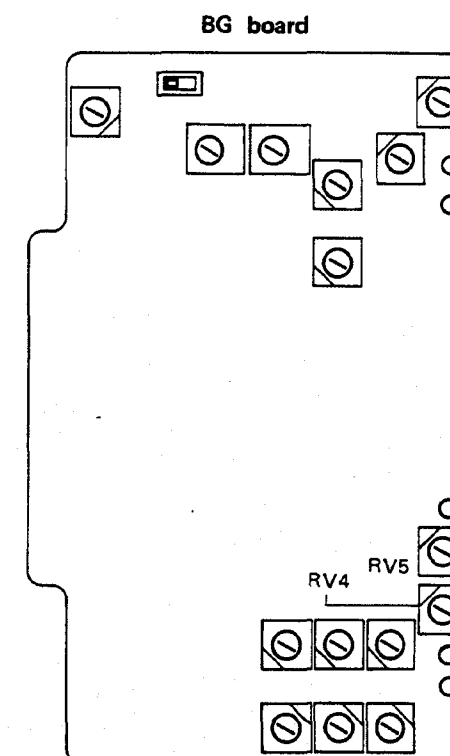
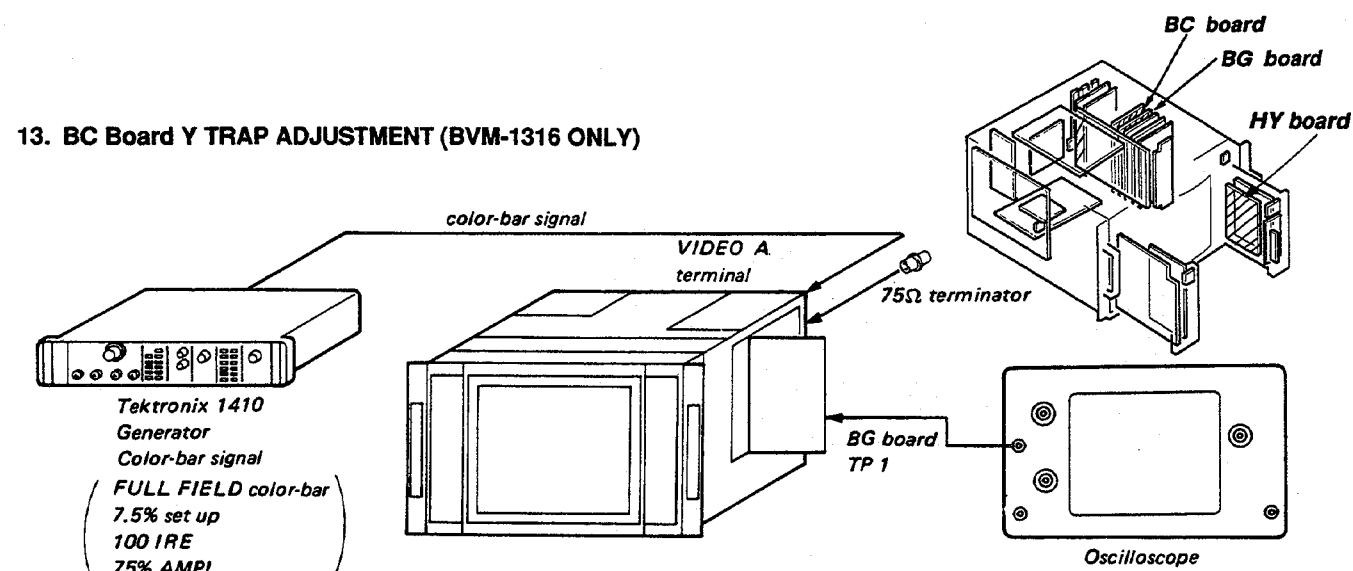


Fig. 12-3



### 13. BC Board Y TRAP ADJUSTMENT (BVM-1316 ONLY)



• YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input color-bar signal to VIDEO A terminal of the set.

2. Connect an oscilloscope to the TP1 of BG board.

3. Adjust L1 of BC board so that 3.58MHz subcarrier is minimum as shown in Fig. 13-1.

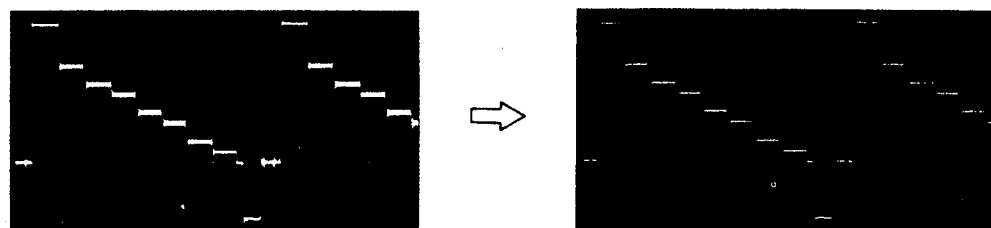
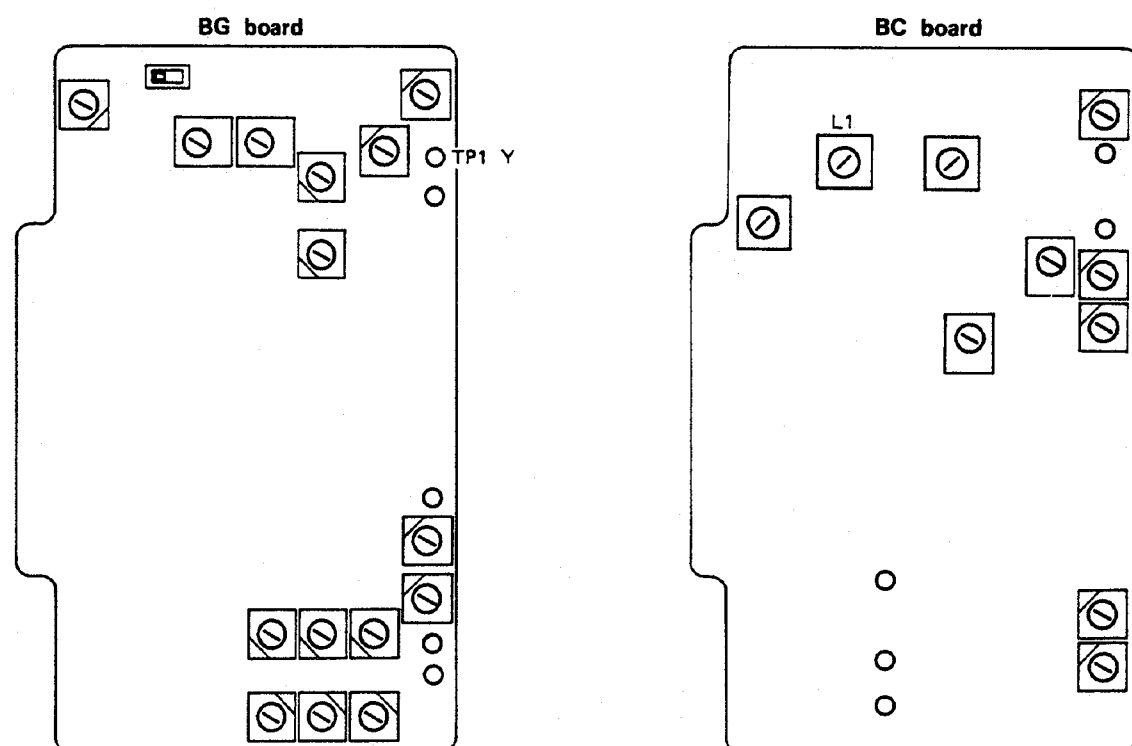
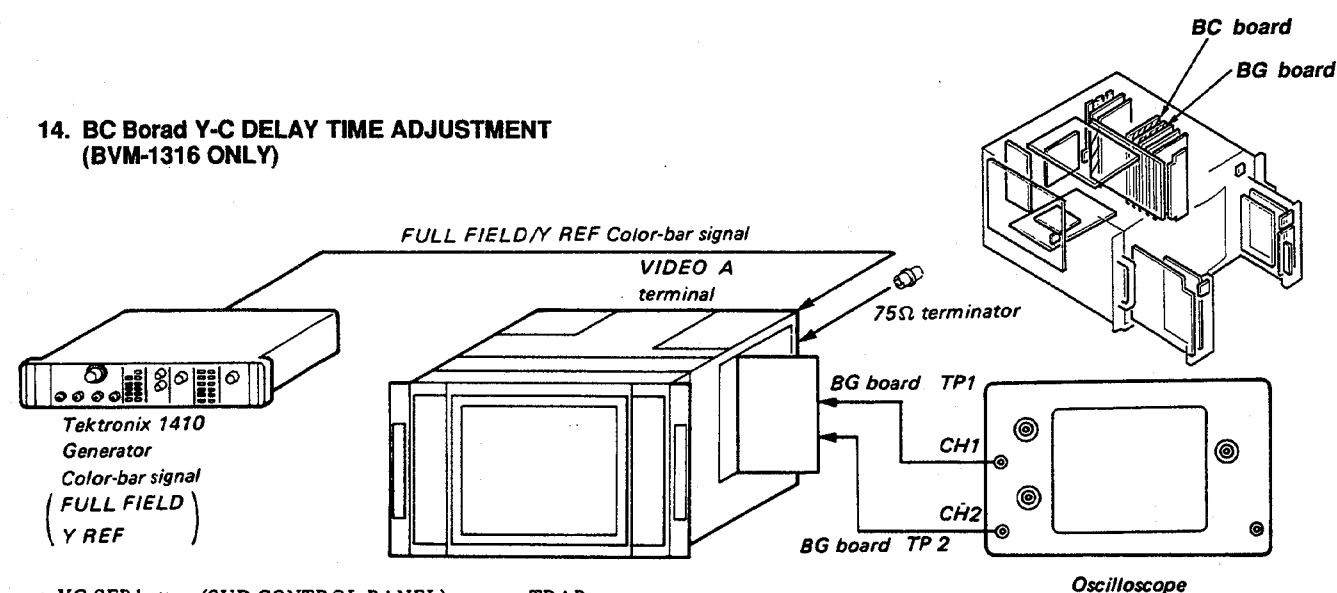


Fig. 13-1



### 14. BC Board Y-C DELAY TIME ADJUSTMENT (BVM-1316 ONLY)



• YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input color-bar signal (FULL FIELD/Y REF) to the VIDEO A terminal of the set.
2. Connect an oscilloscope (CH-1 probe) to the TP1 of BG board and connect an oscilloscope (CH-2 probe) to the TP2 of BG board (VERT mode of the oscilloscope is CHOP).
3. Adjust RV1 of BC board so that the output waveform as shown in Fig. 14-1.

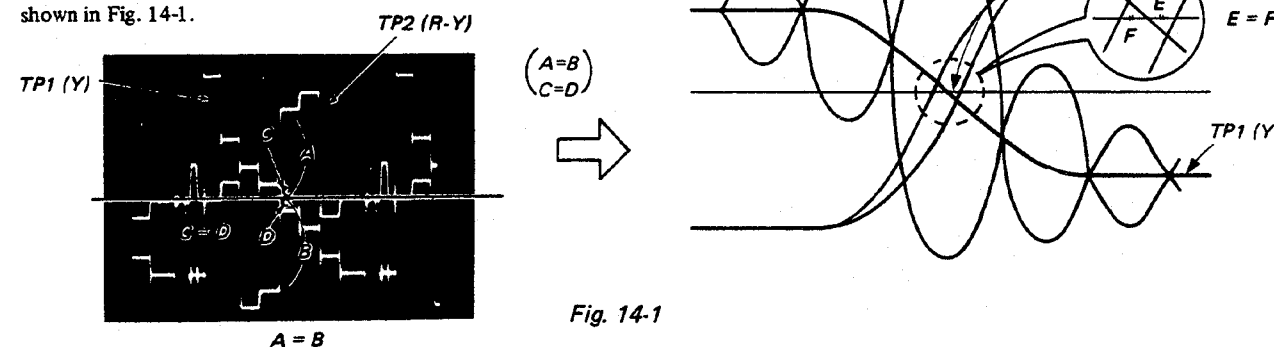
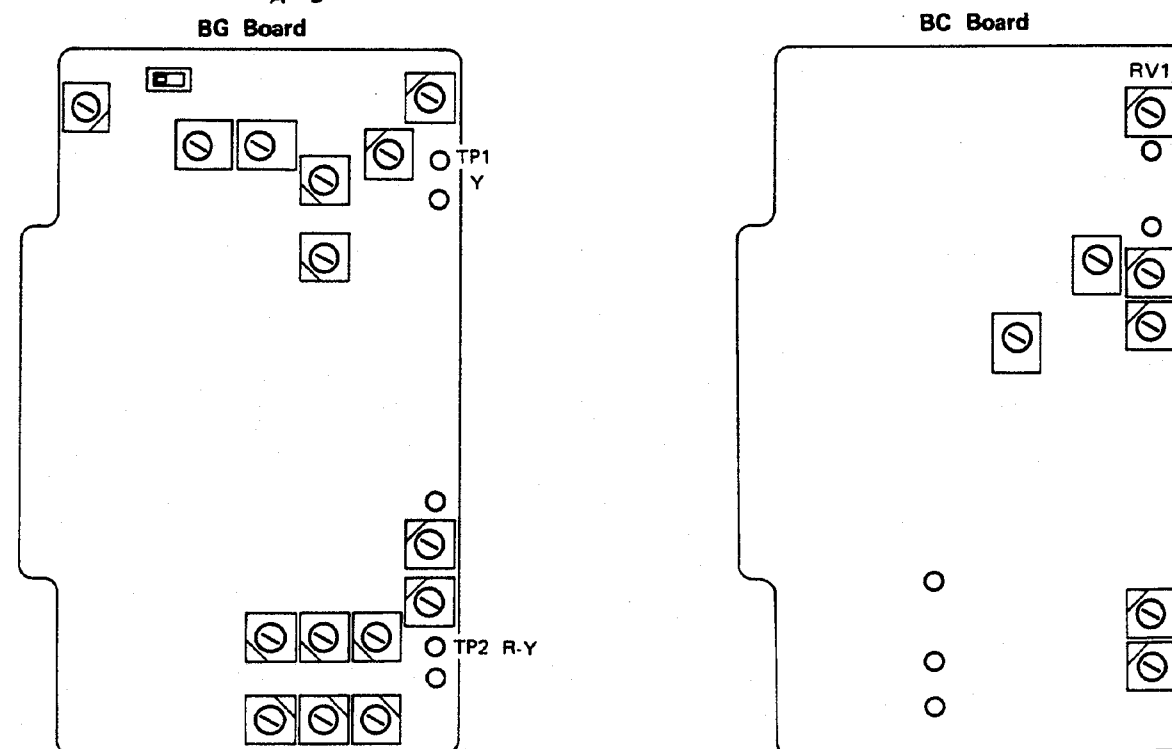
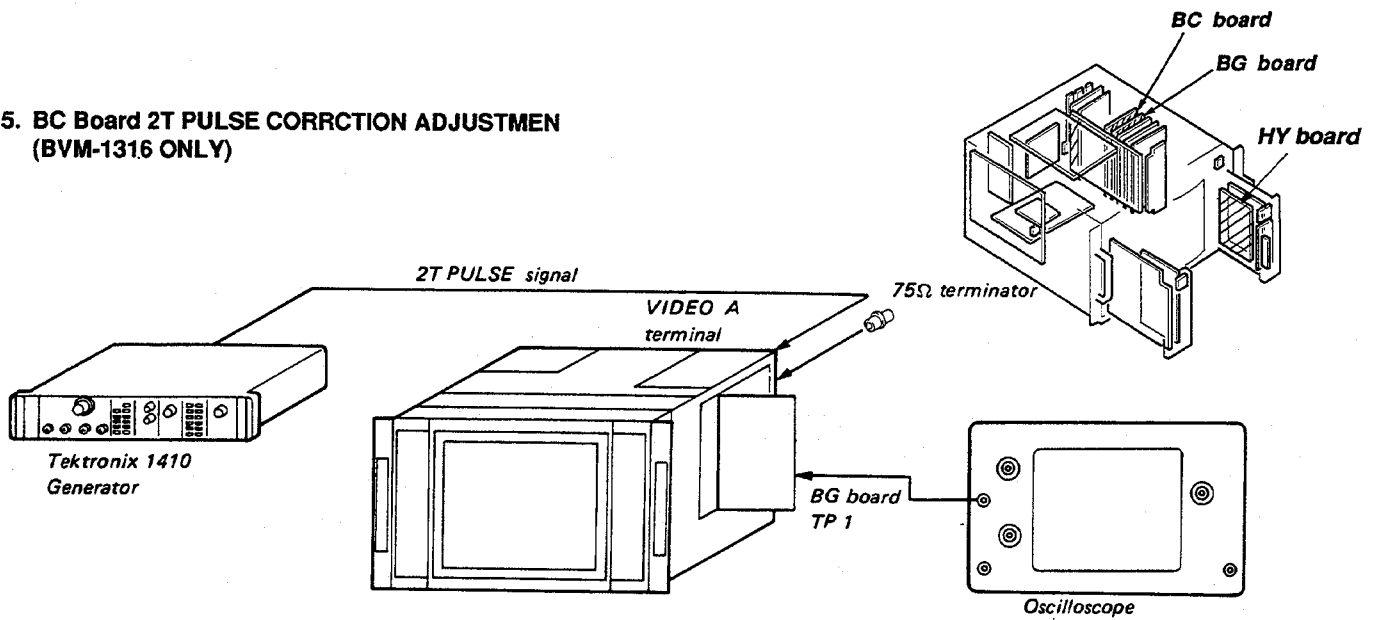


Fig. 14-1

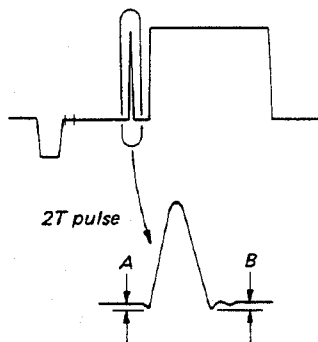


# 15. BC Board 2T PULSE CORRECTION ADJUSTMEN (BVM-1316 ONLY)

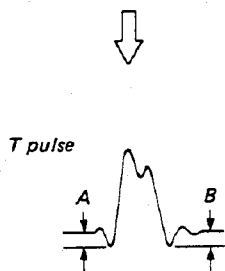


## • YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input 2T pulse signal to VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP1 of BG board.
3. Adjust L2 of BC board so that A is equal to B as shown in Fig. 15-1.
4. Change the input signal from 2T pulse to T pulse, and make sure the waveform balance is not lost extremely as shown in Fig. 15-1.

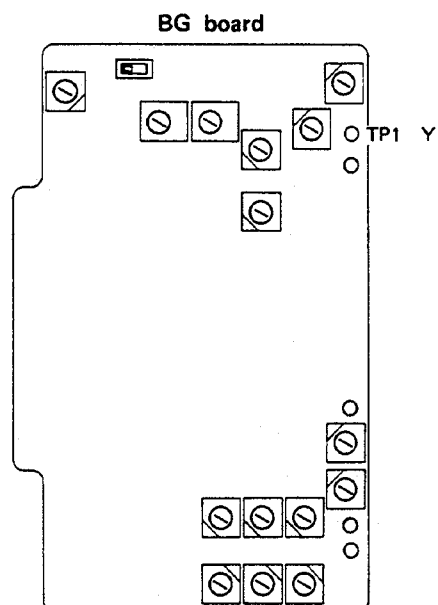
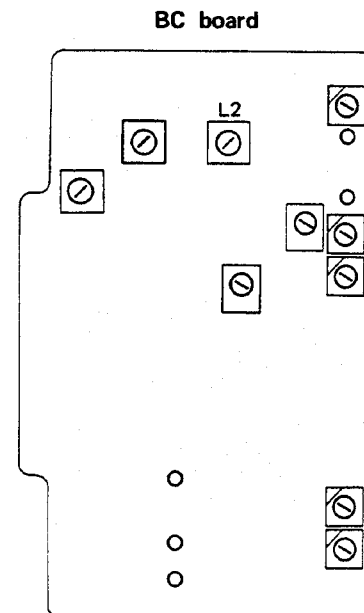


\* Adjust L2 to obtain the condition  $A = B$ .

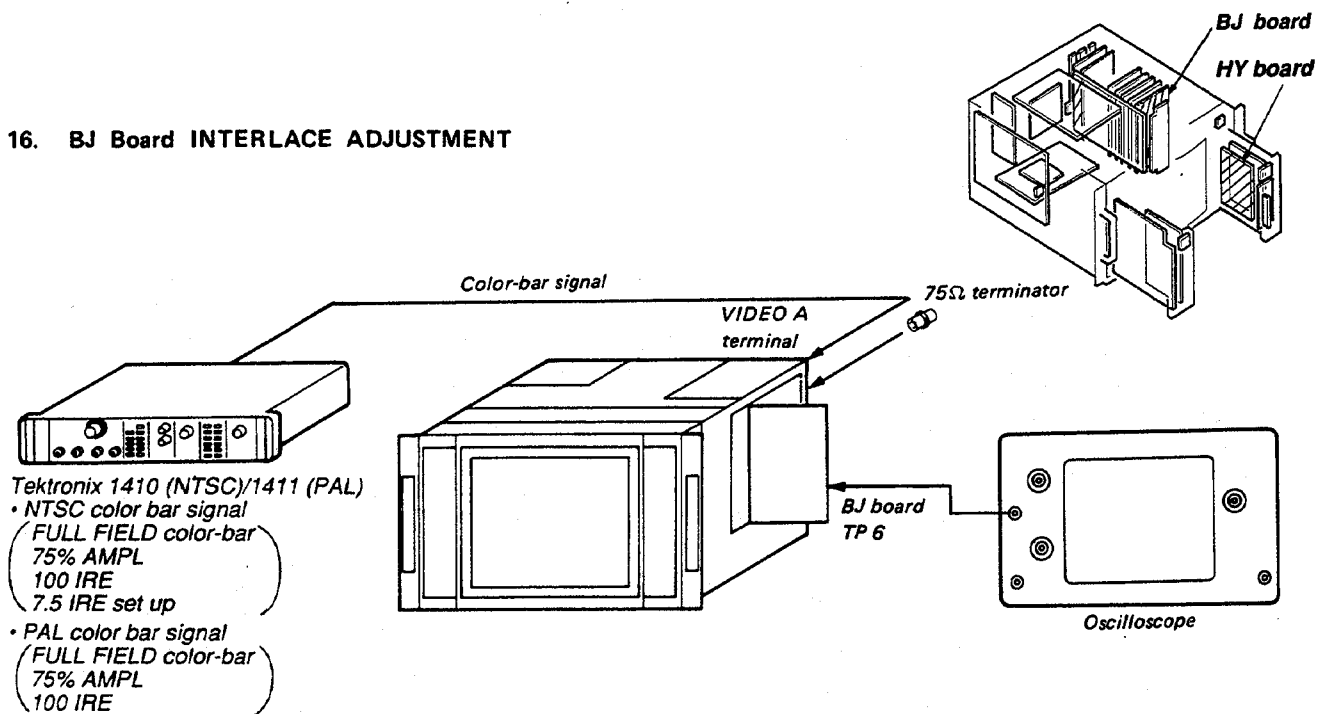


\* The waveform balance should not be lost extremely.

Fig. 15-1



## 16. BJ Board INTERLACE ADJUSTMENT



### • YC SEP button (SUB CONTROL PANEL) ..... TRAP

1. Input color-bar signal to the VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP6 on the BJ board.
3. Adjust RV6 to obtain the waveform on the oscilloscope as shown in Fig. 16-1.

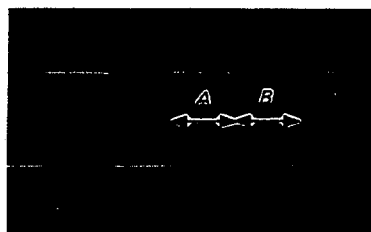
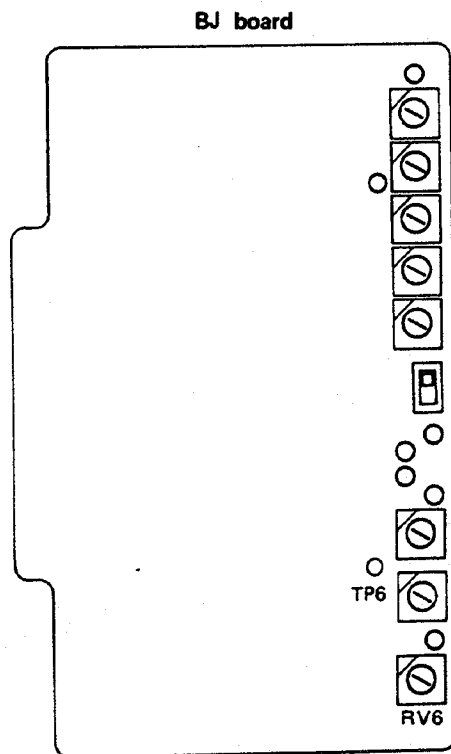
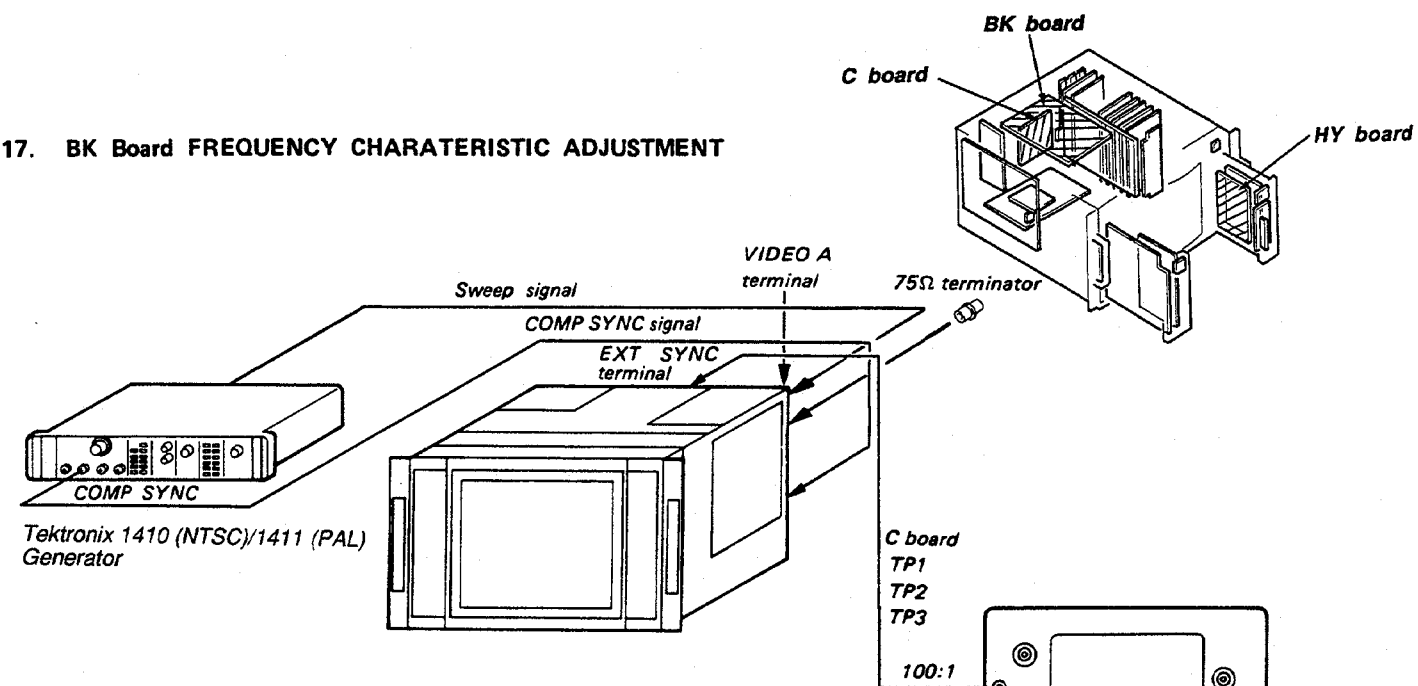



Fig. 16-1



# 17. BK Board FREQUENCY CHARACTERISTIC ADJUSTMENT



1. Input SWEEP signal to VIDEO A terminal of the set, and input COMP SYNC signal to EXT SYNC terminal of the set.
  - SYNC button (SUB CONTROL PANEL) ..... EXT
  - MODE selector (FRONT PANEL (L)) ..... MONO (  )
  - FILTER button (SUB CONTROL PANEL) ... OFF
2. Connect an oscilloscope to the TP1 on the C board.
  - \*Probe: 100:1
3. Adjust CV101 and RV101 on the BK board so that output waveform becomes flat in a range of 0 to 8MHz as shown in Fig. 17-1.
4. Connect an oscilloscope to the TP2 on the C board.
5. Adjust CV201 and RV201 on the BK board so that output waveform becomes flat in a range of 0 to 8MHz as shown in Fig. 17-1.
6. Connect an oscilloscope to the TP3 on the C board.
7. Adjust CV301 and RV301 on the BK board so that output waveform becomes flat in a range of 0 to 8MHz as shown in Fig. 17-1.

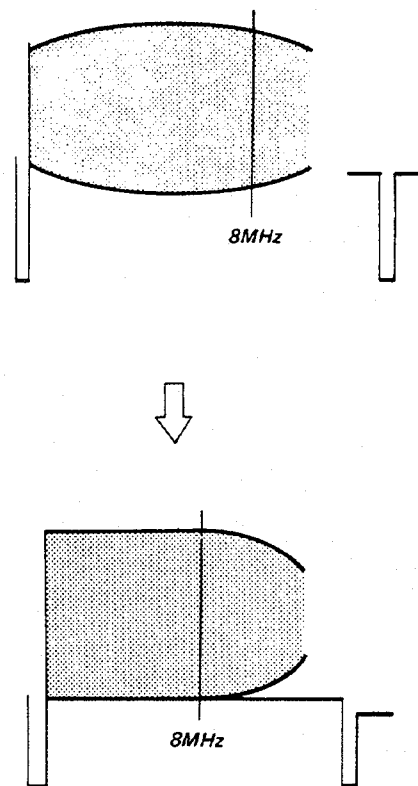
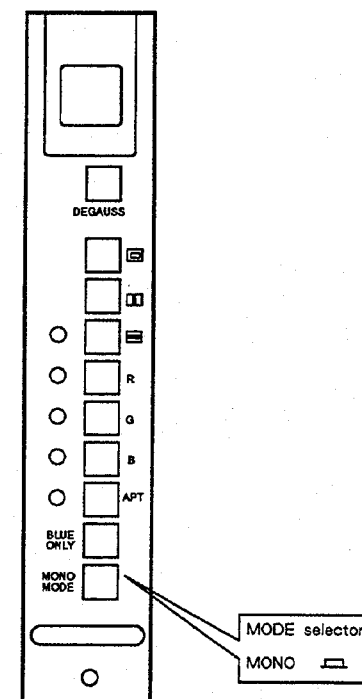
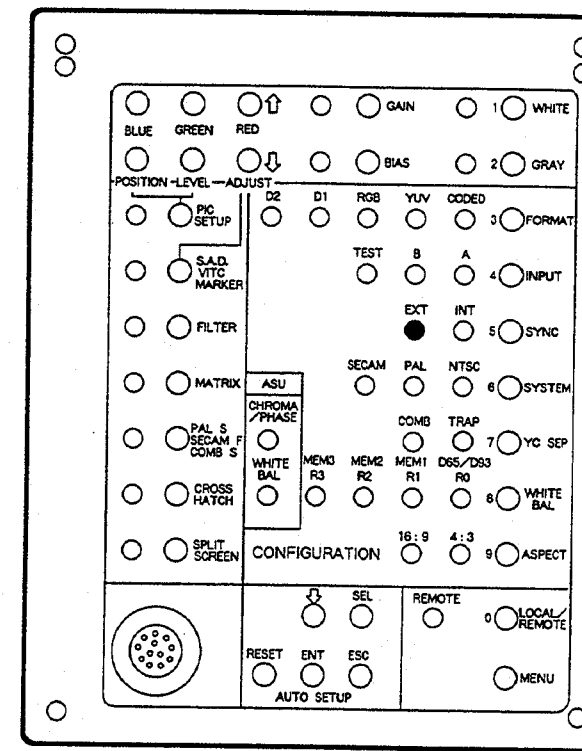


Fig. 17-1

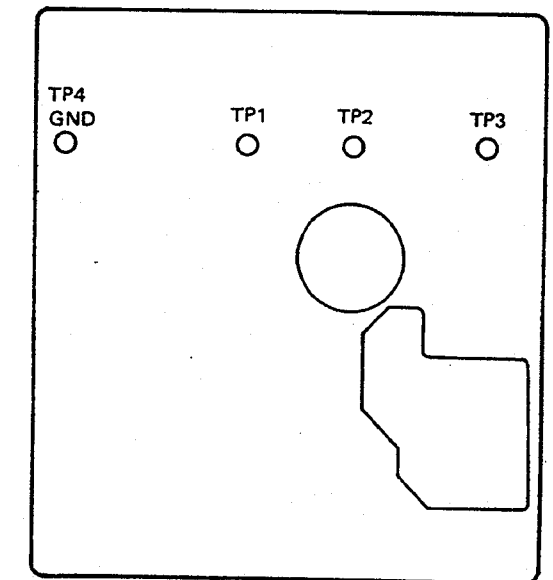
## FRONT PANEL (L)



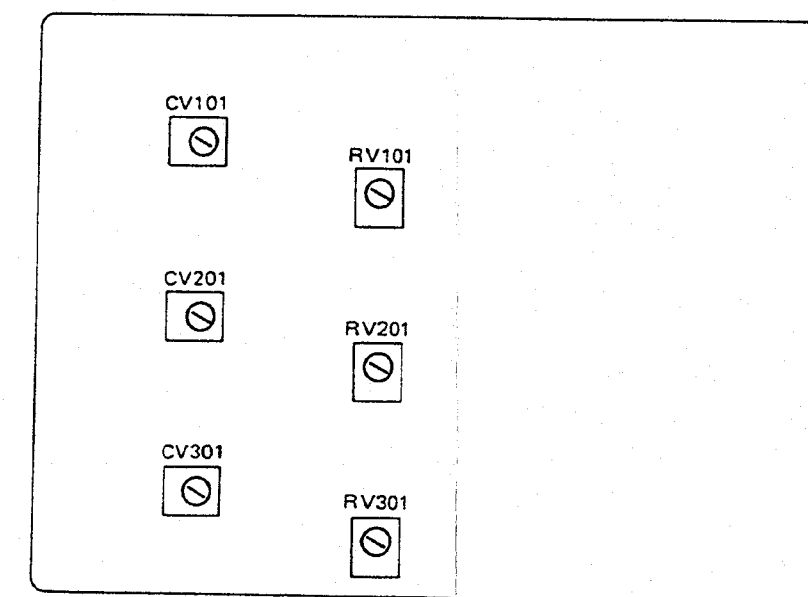
## SUB CONTROL PANEL (HY board)



## C board

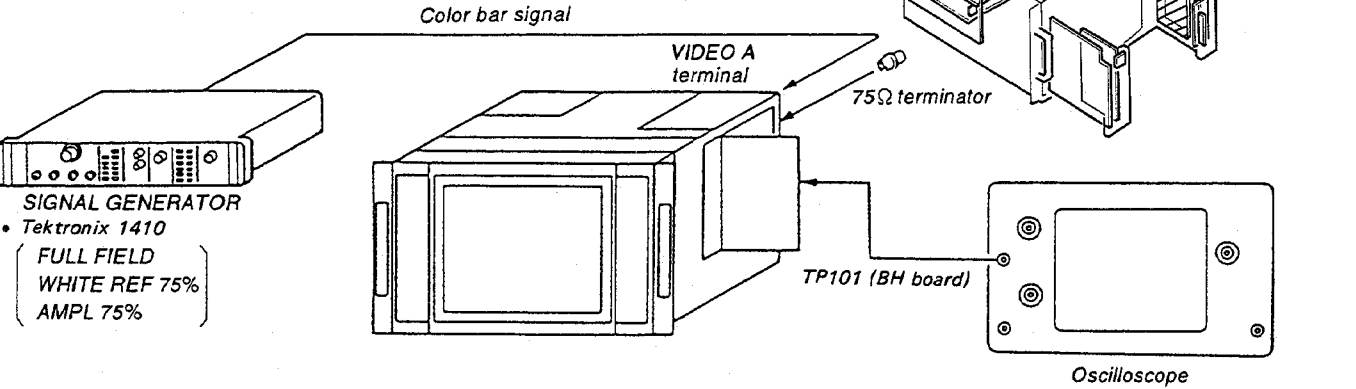


## BK board



18. BT Board COMB FILTER ADJUSTMENT  
(BVM-1316 ONLY)

18-1. BT Board Partial Adjustment



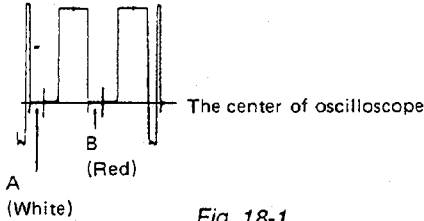
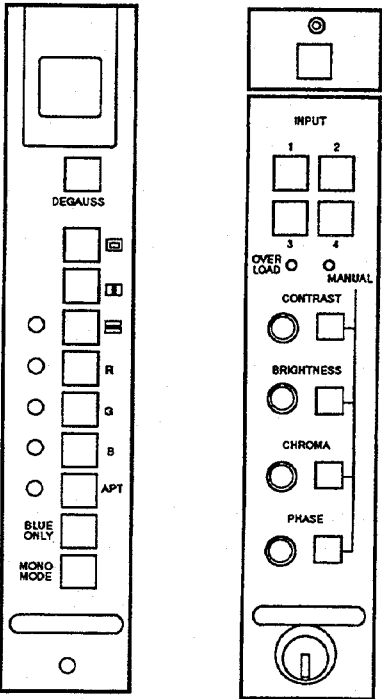
Luminance Level Adjustment

1. Feed a color bar signal to VIDEO A INPUT terminal of this set.
2. Set the YC SEP button on the sub control panel to TRAP position.
3. Connect the oscilloscope to TP101 (R OUT) on the BH board. (DC 0.1 V/div:H)
4. Turn the POSITION control of the oscilloscope to set the portion A (white) of Fig. 18-1 to the center of the oscilloscope.
5. Set the YC SEP button on the sub control panel to the COMB position.
6. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
7. Set the portion A (white) of Fig. 18-1 to the center of the oscilloscope using RV3 (luminance level) on the BT board.

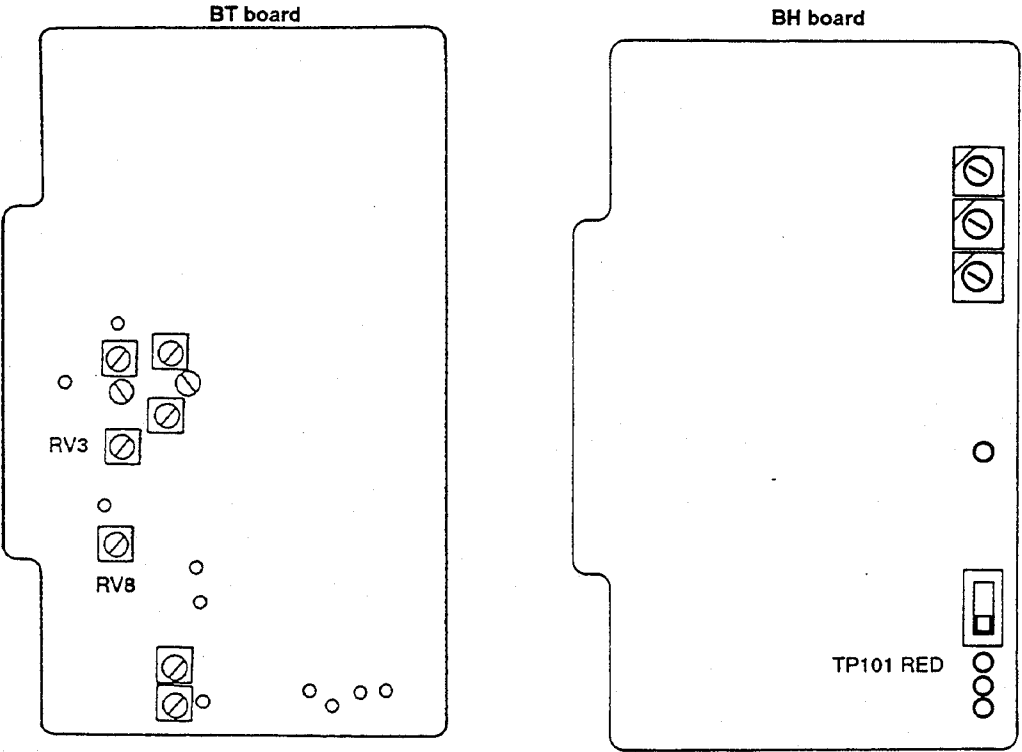
Chroma Level Adjustment

1. Feed a color bar signal to VIDEO A INPUT terminal of this set.
2. Set the YC SEP button on the sub control panel to the TRAP position.
3. Connect the oscilloscope to TP101 on the BH board. (DC 0.1 V/div:H)
4. Turn the POSITION control of the oscilloscope to set the portion A (white) of Fig. 18-1 to the center of the oscilloscope.
5. Set the YC SEP button to the COMB position.
6. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
7. Set the portion B (red) of Fig. 18-1 to the center of the oscilloscope using RV8 (chroma level) on the BT board.

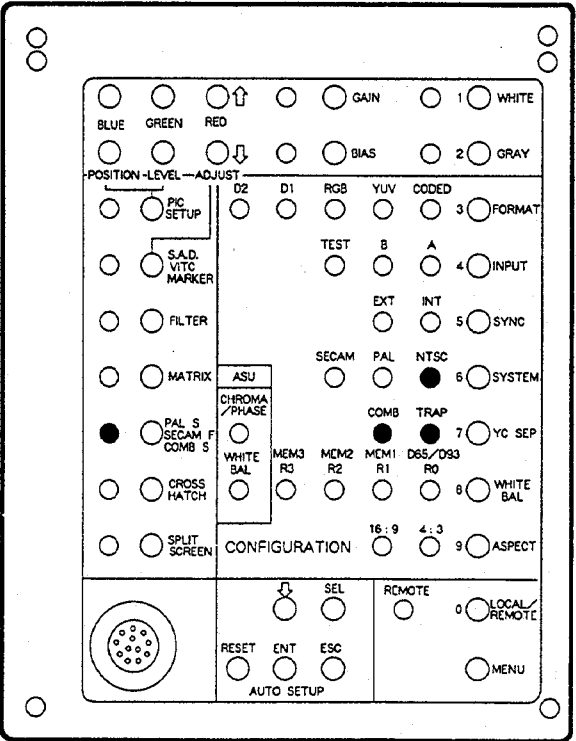
FRONT PANEL (L) FRONT PANEL (R)



**Note:** Never attempt to turn the following parts as these cannot be easily adjusted.  
FL1, FL2, FL3, DL3, DL5, DL6, DL8

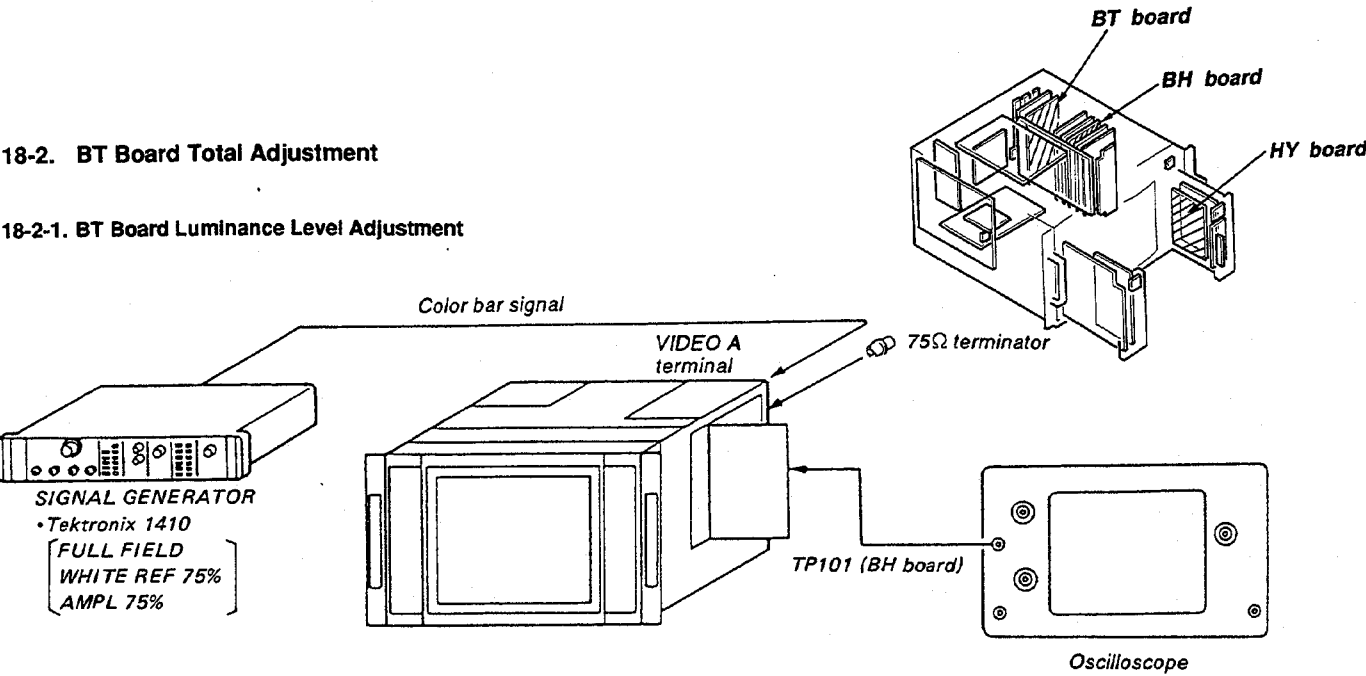


SUB CONTROL PANEL (HY board)

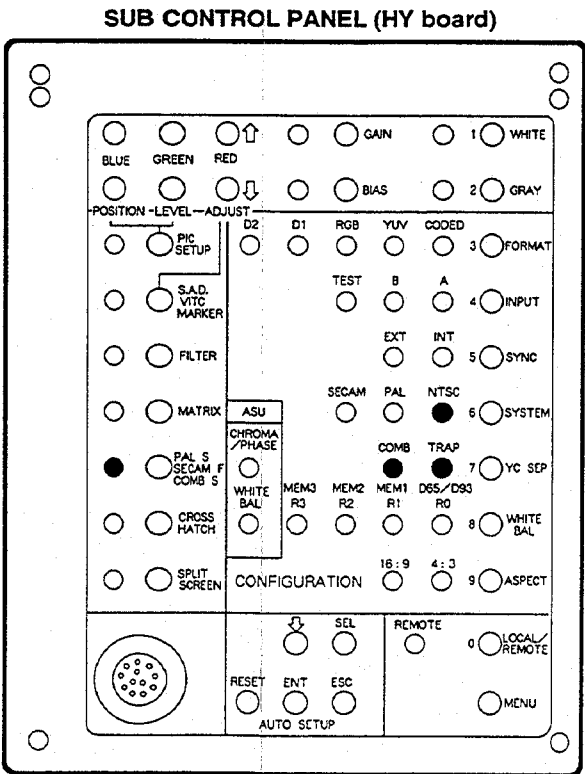
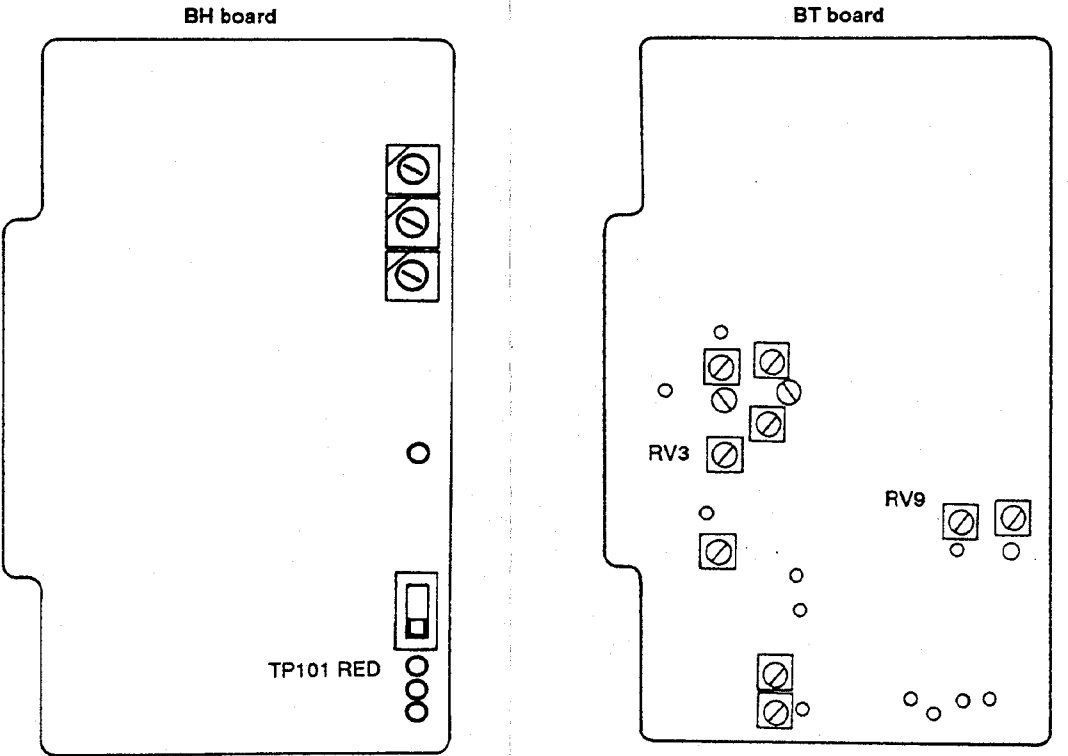
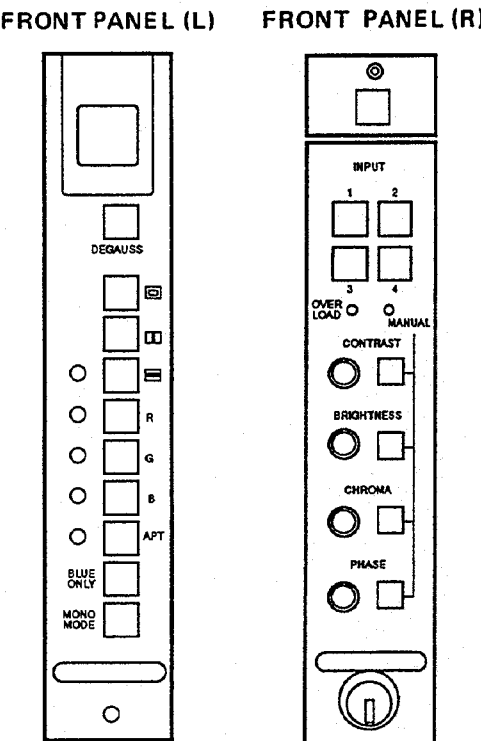
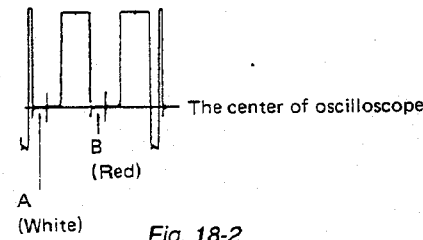


18-2. BT Board Total Adjustment

18-2-1. BT Board Luminance Level Adjustment

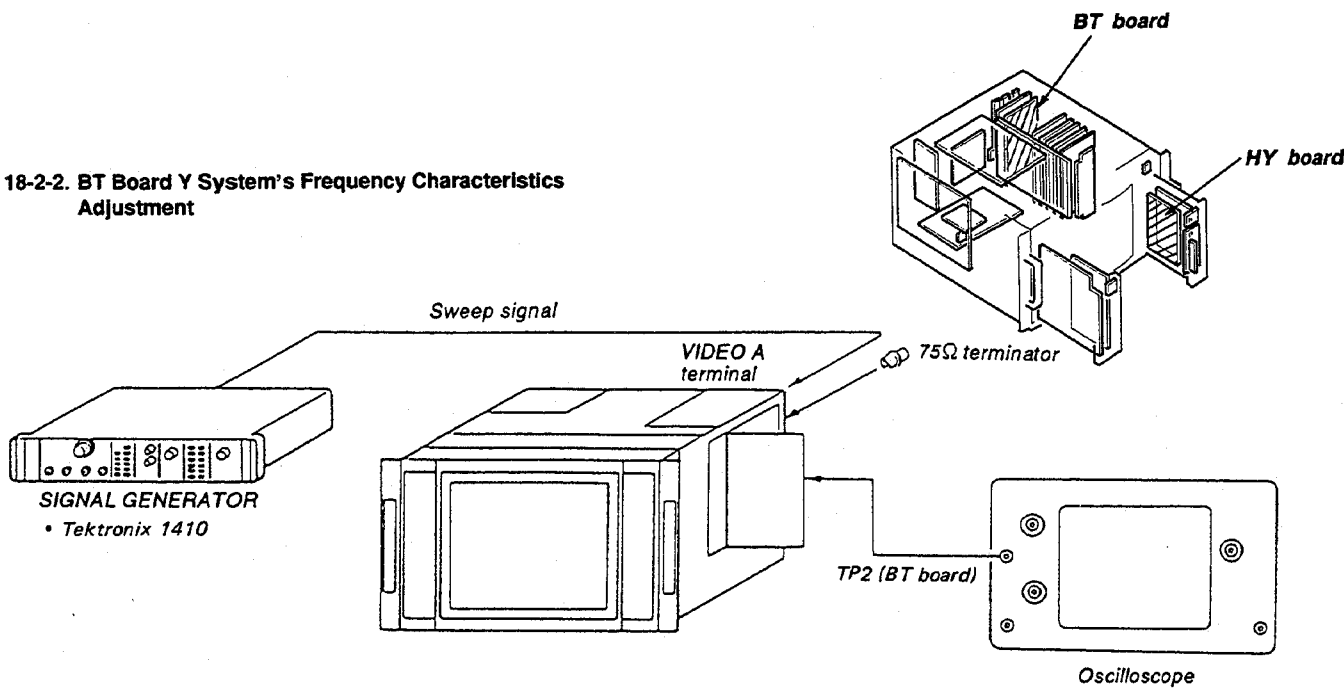


1. Feed a color bar signal to VIDEO A INPUT terminal of this set.
2. Set the YC SEP switch on the sub control panel to the TRAP position.
3. Connect the oscilloscope to TP101 (R OUT) on the BH board. (DC 0.1 V/div:H)
4. Turn the POSITION control of the oscilloscope until the portion A (white) of Fig. 18-2 is set to the center of the oscilloscope.
5. Set the YC SEP button to the COMB position.
6. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
7. Set the portion A (white) of Fig. 18-2 to the center of the oscilloscope using RV3 (luminance level) on the BT board.
8. Set the PAL S/SECAM F/COMB S button to the OFF.
9. Set the portion A (white) of Fig. 18-2 to the center of the oscilloscope using RV9 (1H luminance level) on the BT board.





18-2-2. BT Board Y System's Frequency Characteristics Adjustment



1. Feed a sweep signal to the VIDEO A INPUT terminal of this set.
2. Set the YC SEP switch on the sub control panel to the COMB position.
3. Connect the oscilloscope to TP2 on the BT board. (AC 0.1 V/div:V)
4. Set CV5 to the position as shown in Fig. 18-3.
5. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
6. Adjust the frequency characteristics until it is made flat using CV1 (Y FREQ) on the BT board. If it cannot be properly adjusted by using CV1, use CV5 (Y FREQ).
7. Set the PAL S/SECAM F/COMB S button to the OFF.
8. Adjust the frequency characteristics until it is made flat using CV2 (1H Y FREQ) on the BT board.
9. Set CV3 (CLK PHASE) and CV4 (CLK PHASE) on the BT board to the position as shown in Fig. 18-4.
10. Adjust the clock phase until it becomes just as shown in Fig. 18-5 using CV3.
11. If it cannot be adjusted with CV3, adjust with CV4 by returning CV3 to the position of Fig. 18-4.



Fig. 18-3



Fig. 18-4

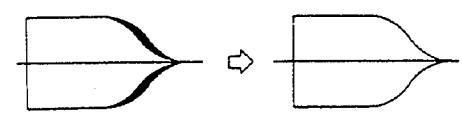
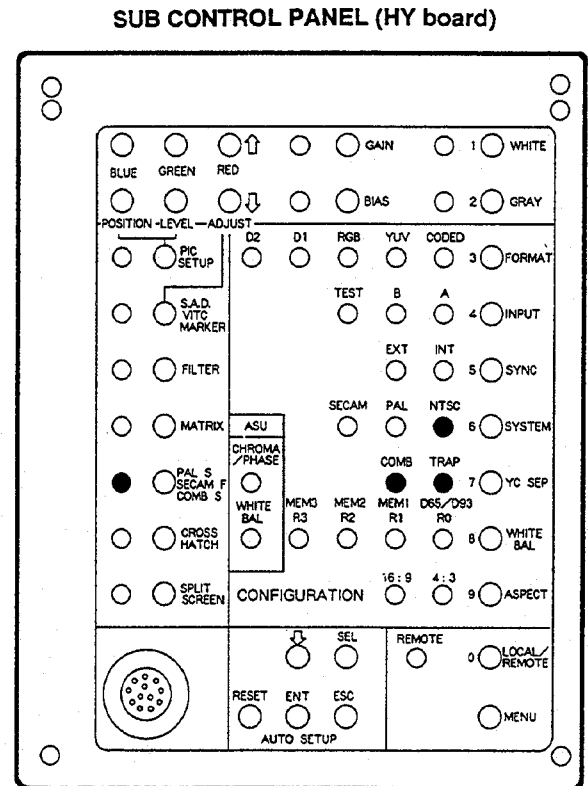
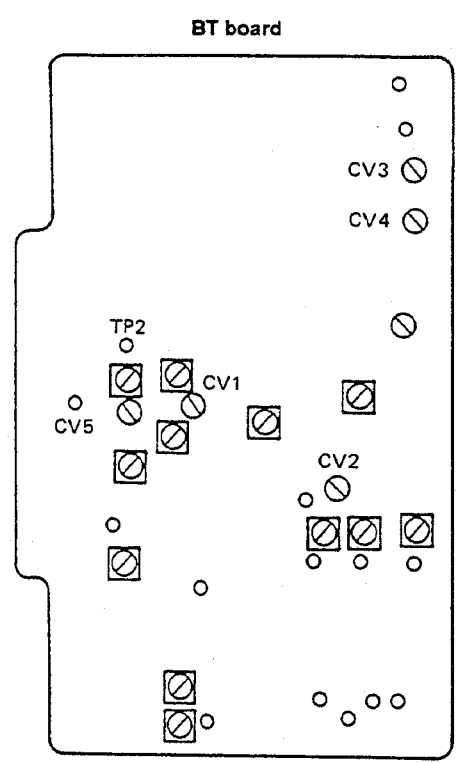
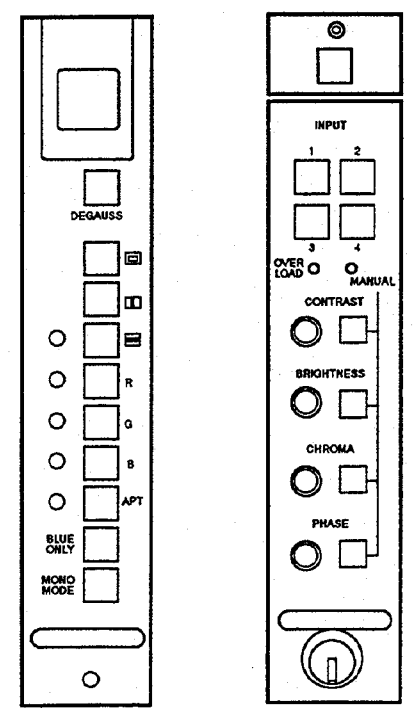
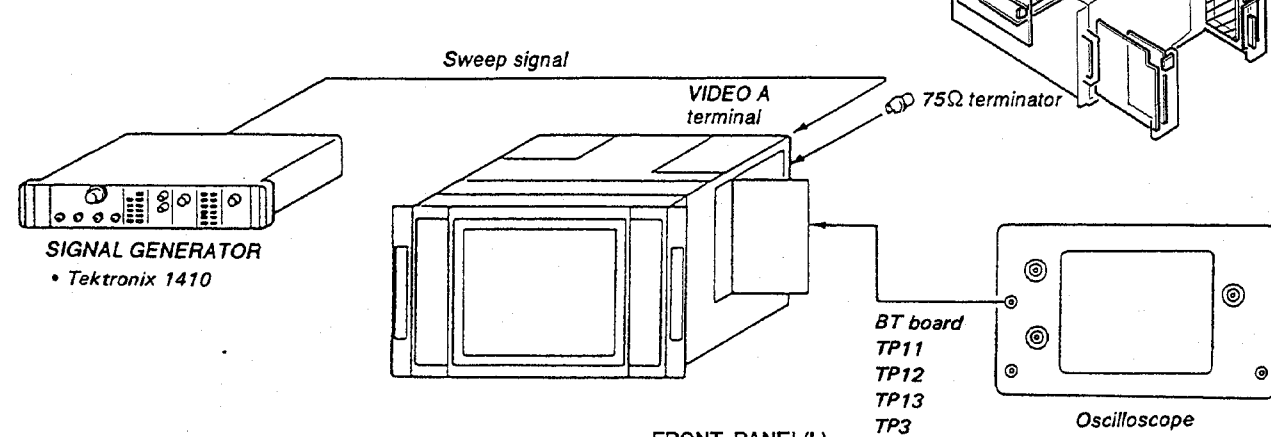


Fig. 18-5

FRONT PANEL (L) FRONT PANEL (R)



**18-2-3. BT Board Band-pass Filter Adjustment**  
(Adjust only when DLs3, 5, 6 and 8 are replaced.)



1. Feed a sweep signal to the VIDEO A INPUT terminal of this set.
2. Set the PAL S/SECAM F/COMB S button on the front panel to the ON.
3. Connect the oscilloscope to TP11 on the BT board.
4. Adjust the frequency characteristics using DL3 on the BT board so that the waveform becomes symmetrical as shown in Fig. 18-6 with 3.58 MHz as center frequency.
5. Connect the oscilloscope to TP12.
6. Adjust the frequency characteristics using DL6 on the BT board so that the waveform becomes symmetrical as shown in Fig. 18-6 with 3.58 MHz as center frequency.
7. Connect the oscilloscope to TP13.
8. Adjust the frequency characteristics using DL8 on the BT board so that the waveforms becomes symmetrical as shown in Fig. 18-6 with 3.58 MHz as center frequency.
9. Connect the oscilloscope to TP3.
10. Adjust the frequency characteristics using DL5 on the BT board so that the waveforms becomes symmetrical as shown in Fig. 18-6 with 3.58 MHz as center frequency.

FRONT PANEL(L)

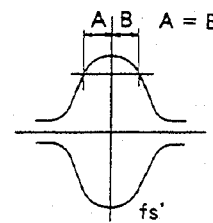
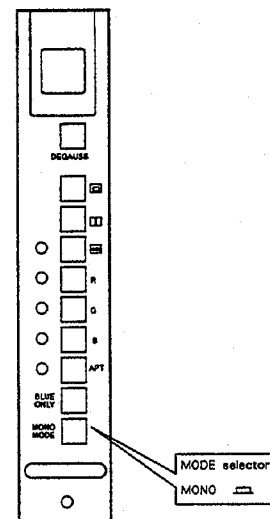
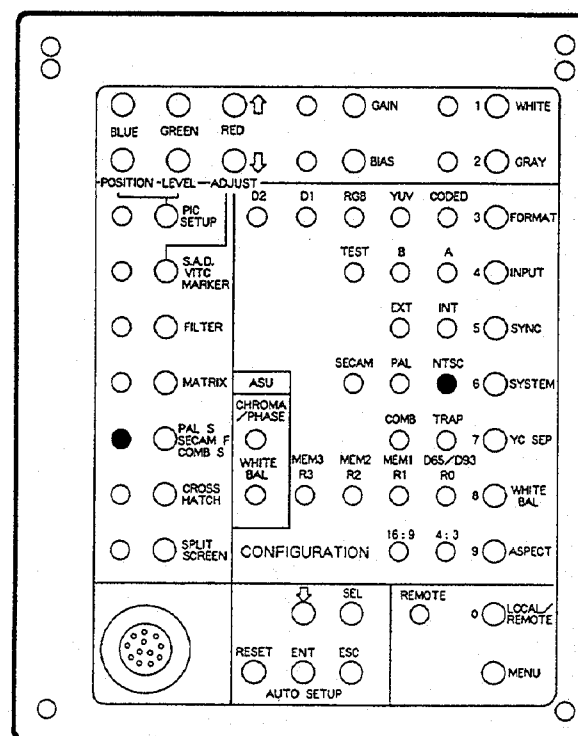
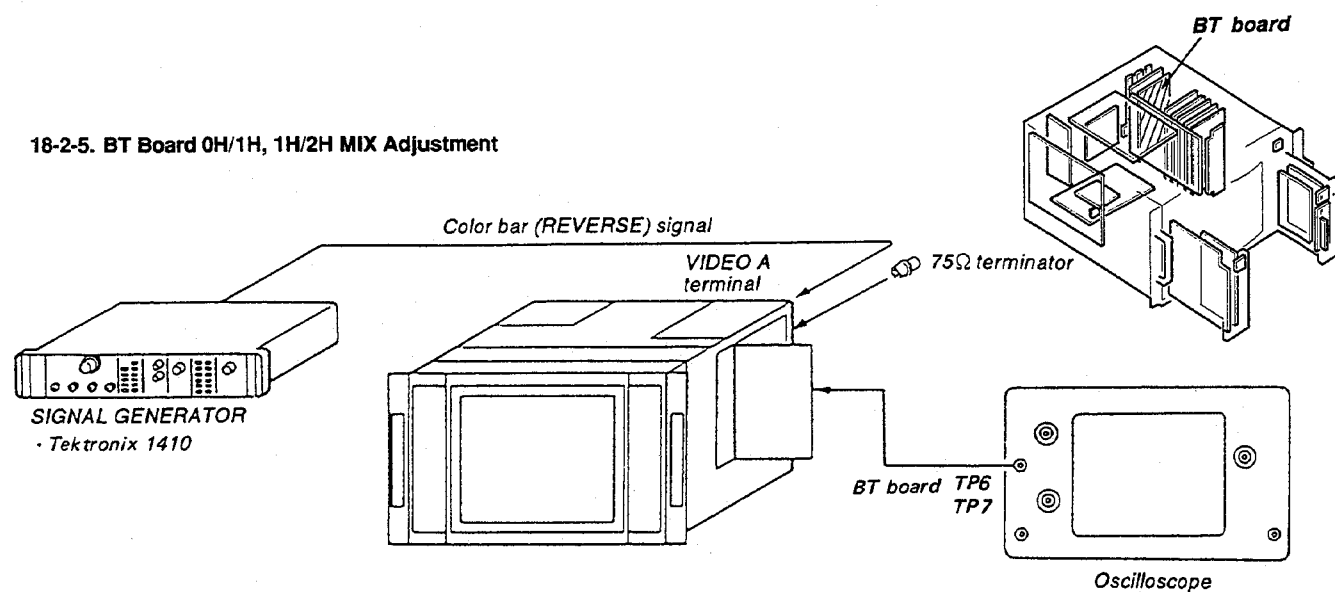


Fig. 18-6

SUB CONTROL PANEL (HY board)



#### 18-2-5. BT Board 0H/1H, 1H/2H MIX Adjustment



1. Feed a color bar signal (REVERSE) to the VIDEO A INPUT terminal of this set.
2. Connect the oscilloscope to TP6 to magnify the signal inverted area.
3. Turn RV5 (0H/1H MIX LEVEL) and RV10 (0H/1H MIX PHASE) on the BT board until the portion shown in Fig. 18-7 is reduced to a minimum.
4. Connect the oscilloscope to TP7.
5. Turn RV12 (1H/2H MIX PHASE) and RV11 (1H/2H MIX LEVEL) on the BT board until the portion shown in Fig. 18-7 is reduced to a minimum.

Enlarged view of inverted signal section

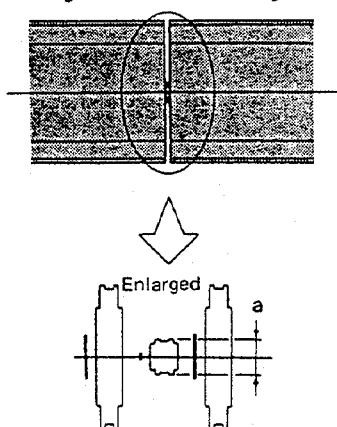
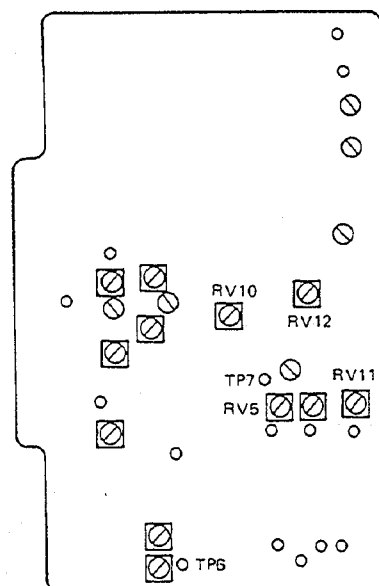
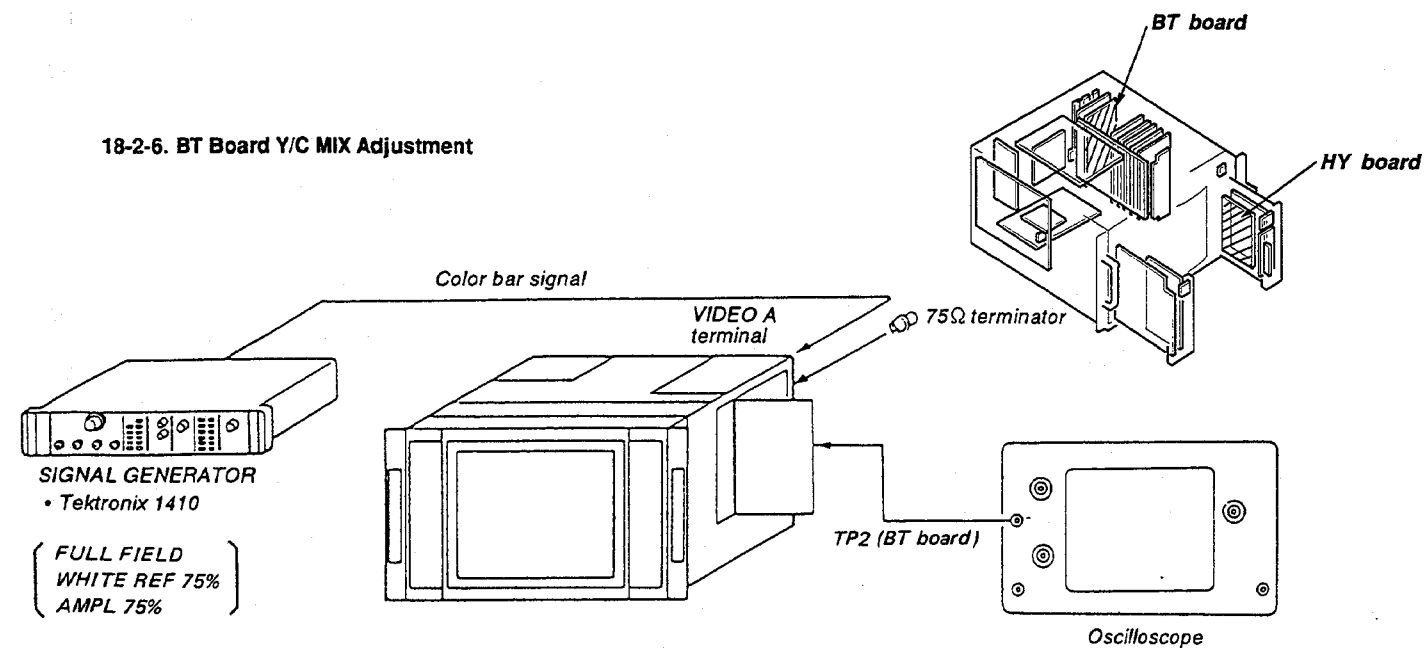


Fig. 18-7

BT board



#### 18-2-6. BT Board Y/C MIX Adjustment



1. Feed a color bar signal to the VIDEO A INPUT terminal of this set.
2. Connect the oscilloscope to TP2 on the BT board.
3. Set the PAL S/SECAM F/COMB S button on the sub control panel to the OFF.
4. Turn RV1 (Y/C MIX PHASE) and RV2 (Y/C MIX LEVEL) on the BT board so that the sub-carrier level is reduced to a minimum as shown in Fig. 18-8.

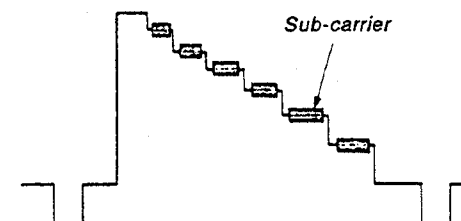
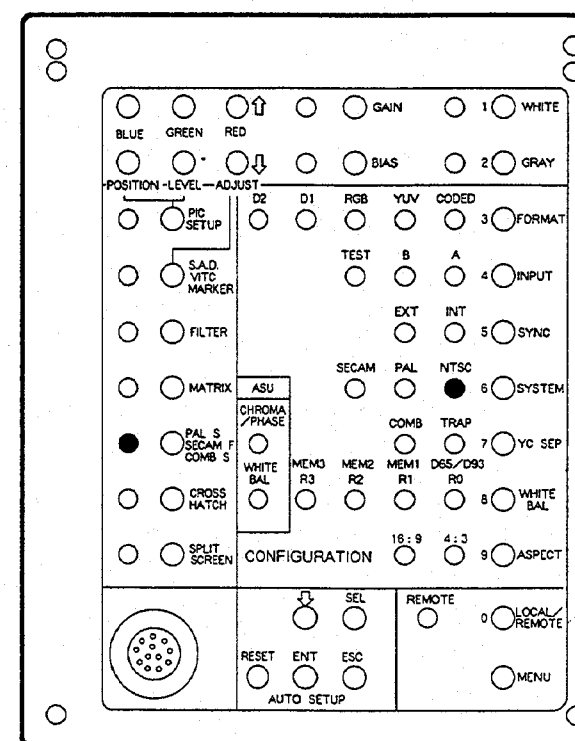


Fig. 18-8

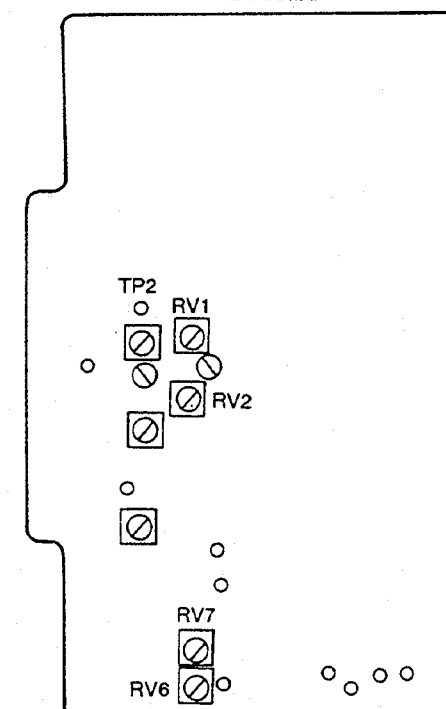
SUB CONTROL PANEL (HY board)



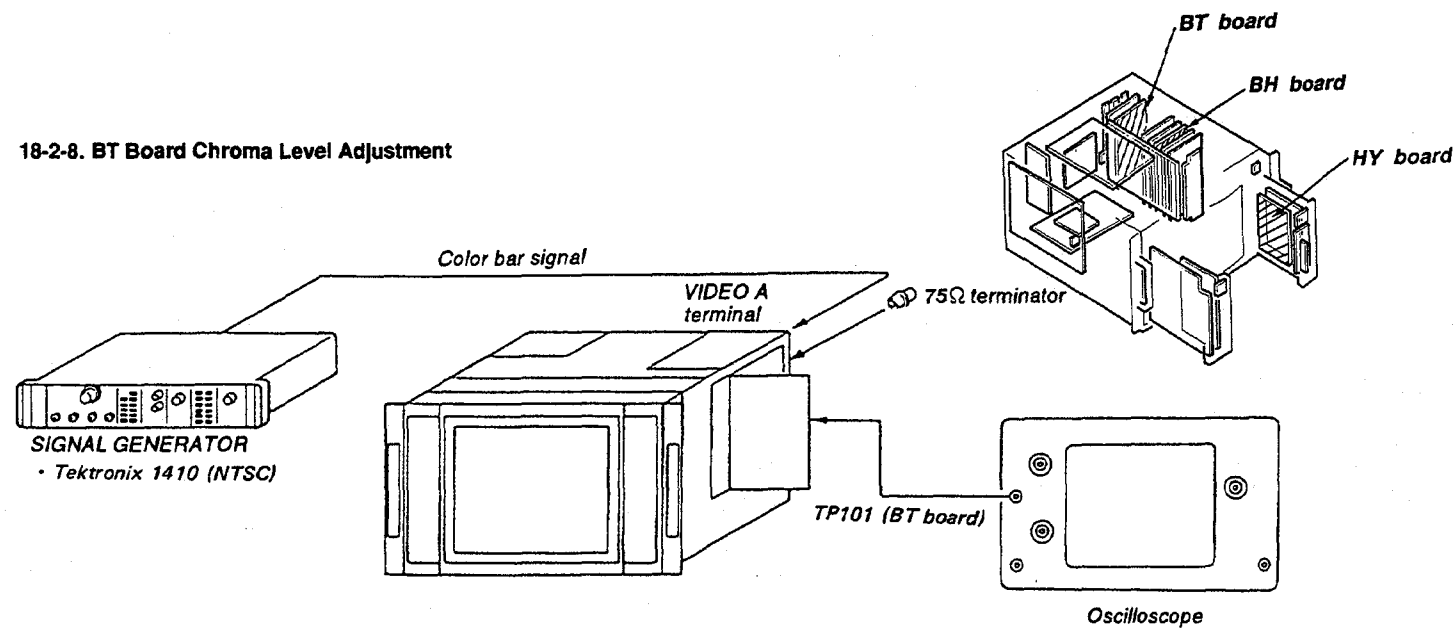
#### 18-2-7. BT Board S COMB Adjustment

1. Feed a color bar signal to the VIDEO A INPUT terminal of this set.
2. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
3. Connect the oscilloscope to TP2 on the BT board.
4. Turn RV6 (S COMB C Level) and RV7 (S COMB C PHASE) on the BT board so that the sub-carrier level is reduced to a minimum as shown in Fig. 18-8.

BT board



# 18-2-8. BT Board Chroma Level Adjustment



1. Feed a color bar signal to the VIDEO A INPUT terminal of this set.
2. Set the YC SEP switch on the sub control panel to the TRAP position.
3. Connect the oscilloscope to TP101 on the BH board.
4. Turn the POSITION control of the oscilloscope to set the portion B (red) of Fig. 18-9 to the center of the oscilloscope.
5. Set the YC SEP button to the COMB position.
6. Set the PAL S/SECAM F/COMB S button on the sub control panel to the ON.
7. Set the portion B (red) of Fig. 18-9 to the center of the oscilloscope using RV8 (C OUTPUT LEVEL) on the BT board.

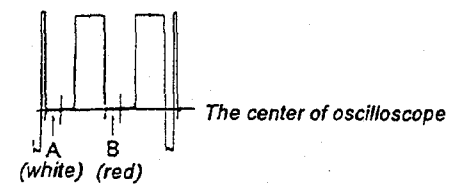
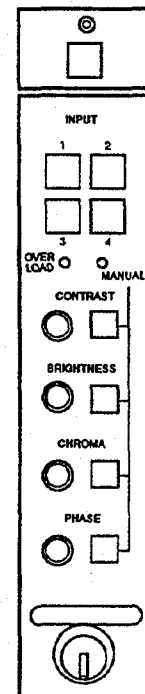
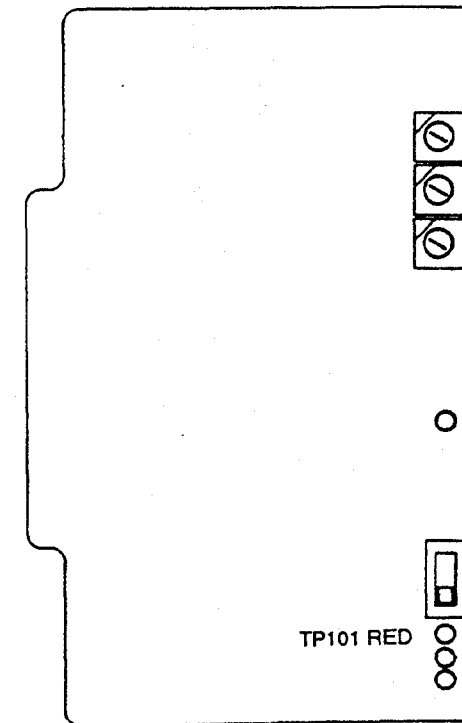


Fig. 18-9

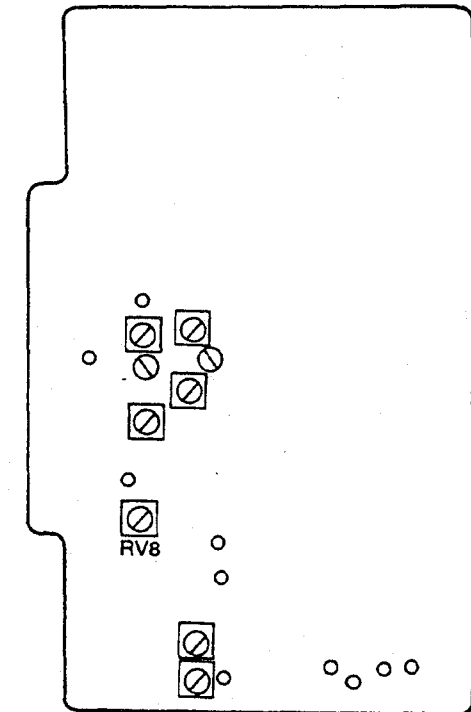
## FRONT PANEL (R)



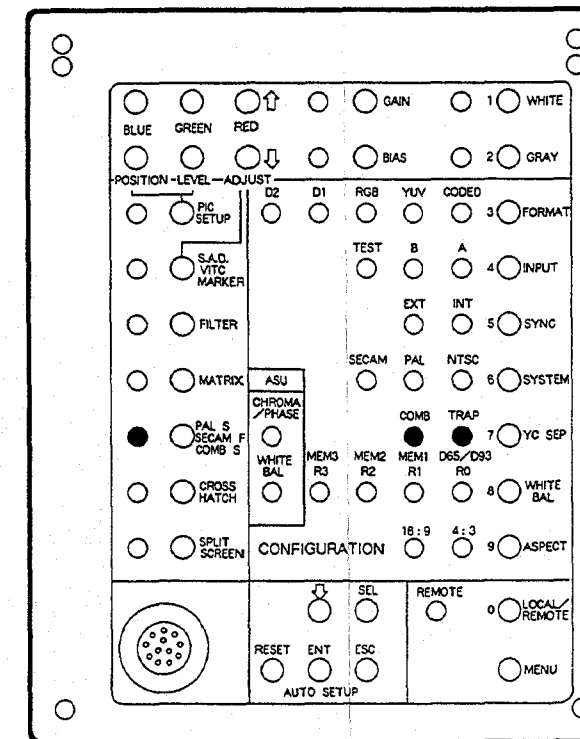
## BH board



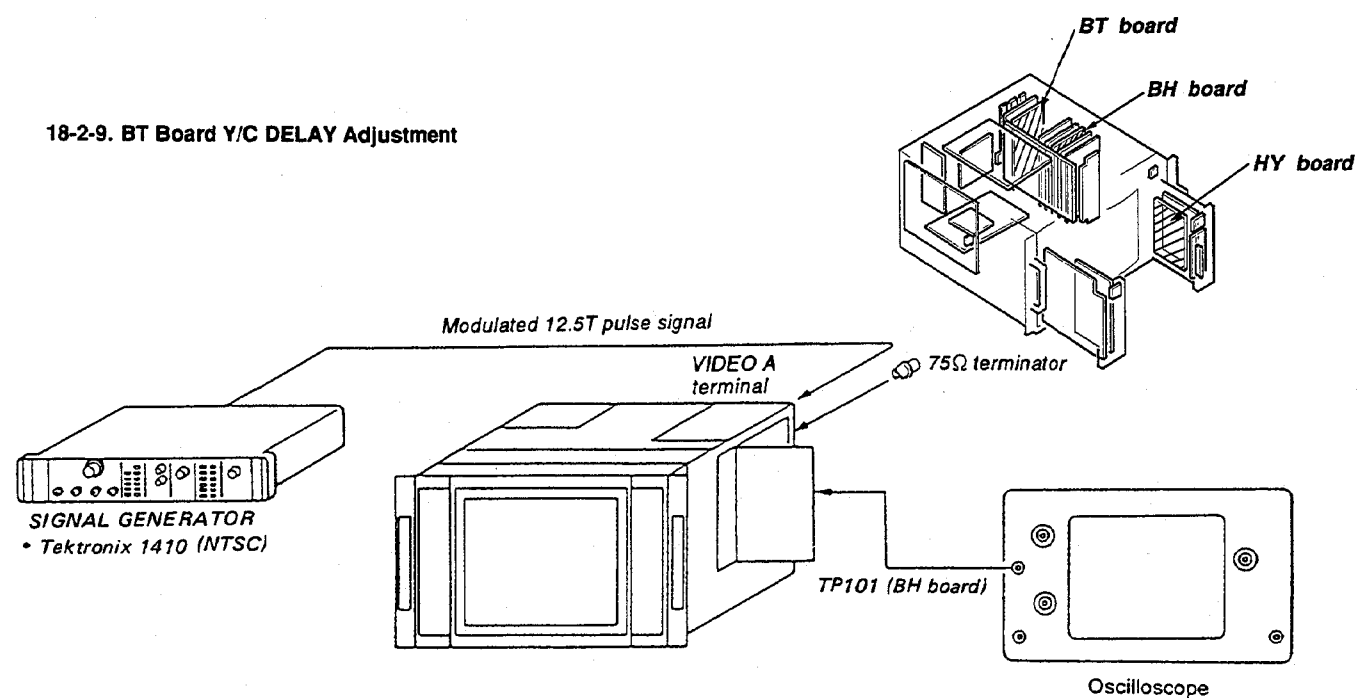
## BT board



## SUB CONTROL PANEL (HY board)



# 18-2-9. BT Board Y/C DELAY Adjustment



1. Feed a 12.5T pulse signal to the VIDEO A terminal of this set.
2. Set the PAL S/SECAM F/COMB S button to the ON.
3. Connect the oscilloscope to TP101 on the BH board.
4. Turn the CHROMA MANUAL control (on the front panel (R)) until the chroma signal is adjusted as shown in Fig. 18-10.
5. After adjustment, turn RV4 (Y/C DELAY) on the BT board until the waveform is symmetrical.

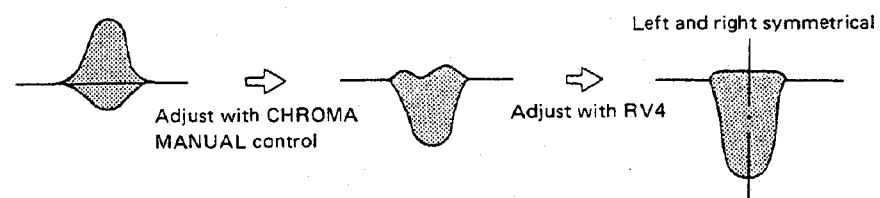
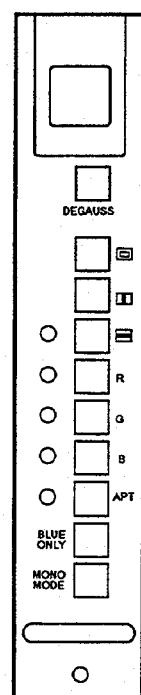
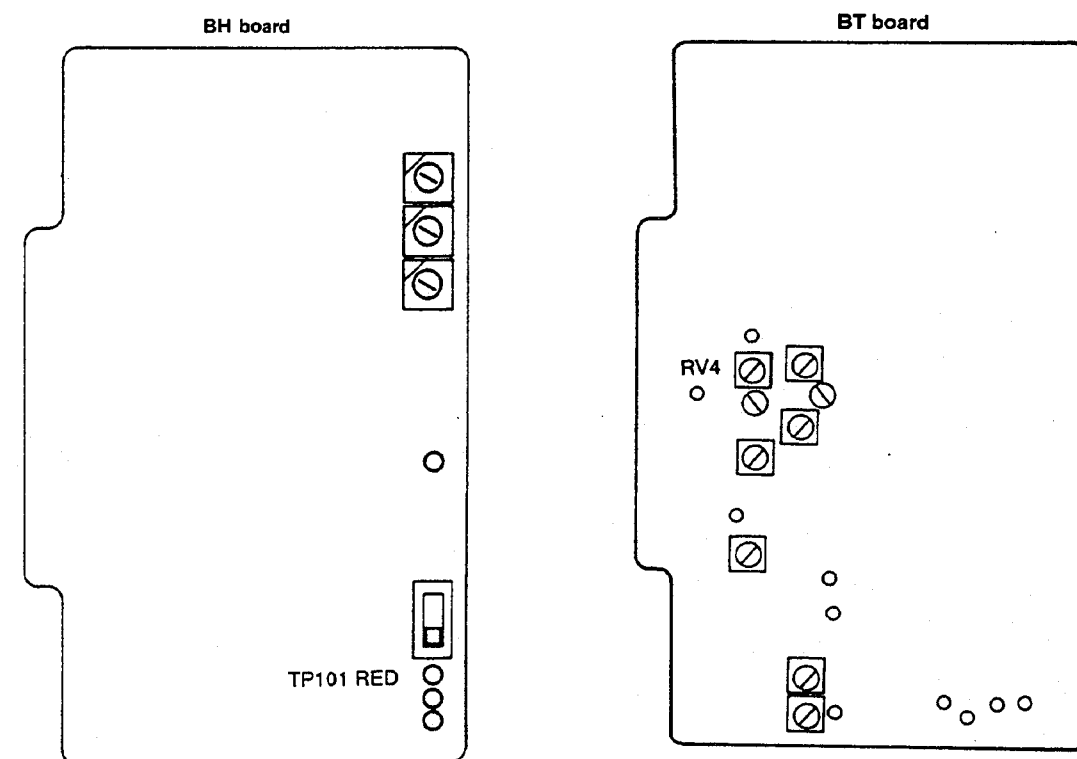
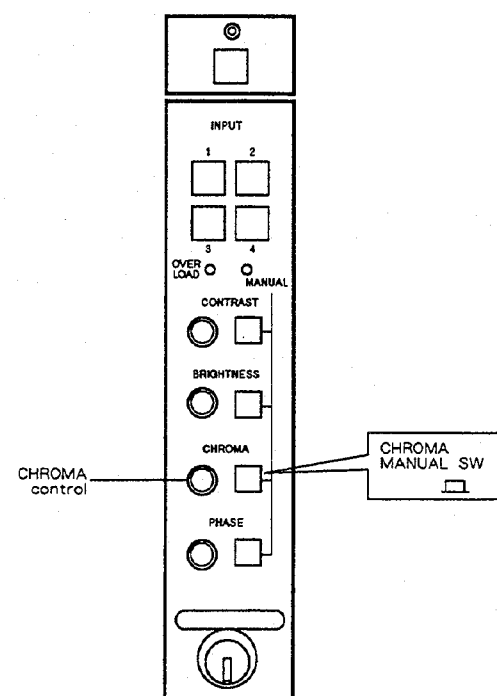


Fig. 18-10

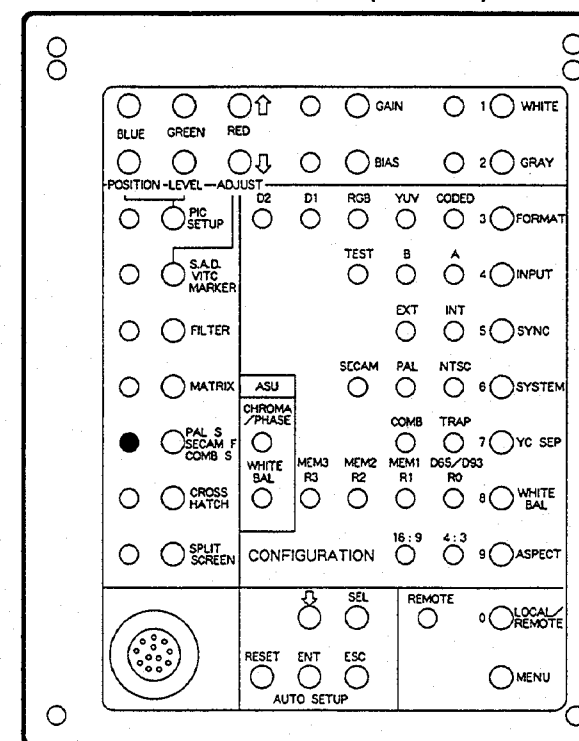
FRONT PANEL(L)



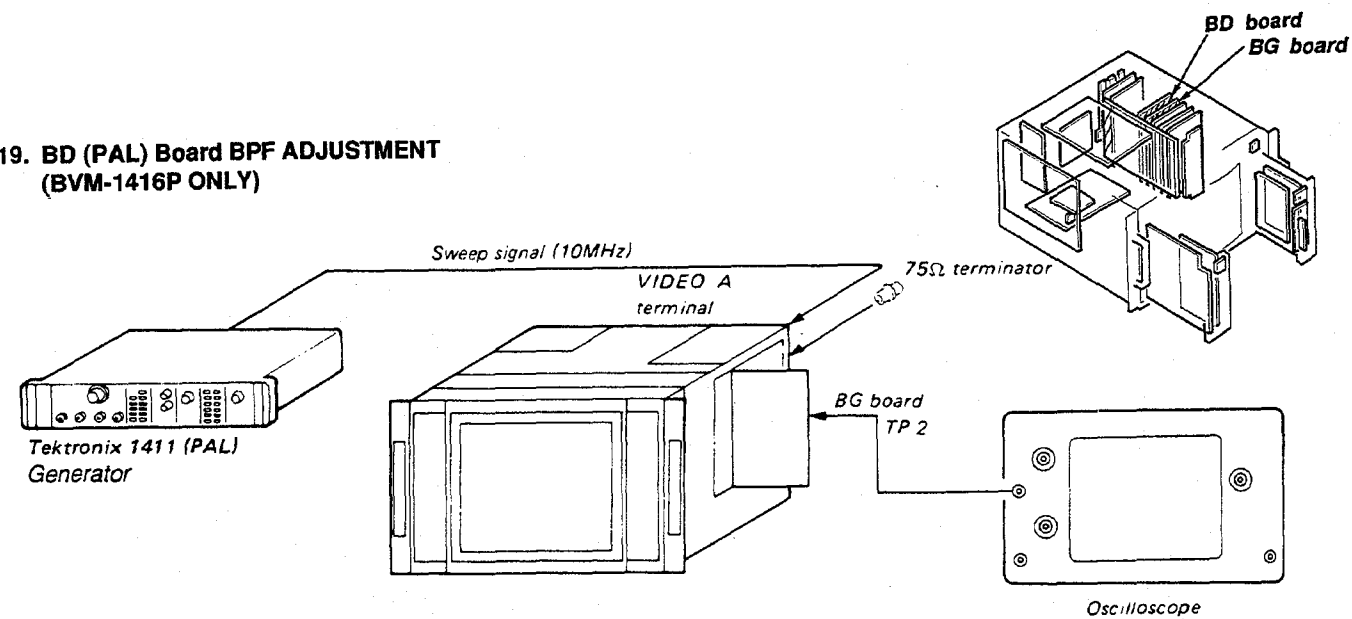
FRONT PANEL(R)



SUB CONTROL PANEL (HY board)



# 19. BD (PAL) Board BPF ADJUSTMENT (BVM-1416P ONLY)



- PAL S/SECAM F/COMB S button (SUB CONTROL PANEL).....ON

1. Input SWEEP signal (10MHz) to the VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP2 on the BG board.
3. Make the V/div of oscilloscope into VARIABLE, and match the upper section of waveform to 7 div as shown in Fig. 19-1.

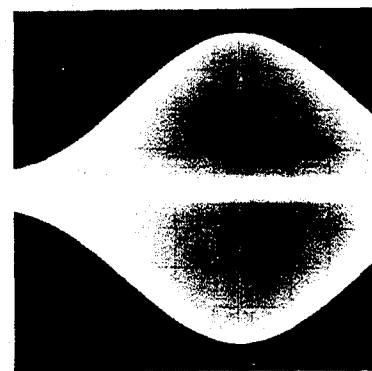
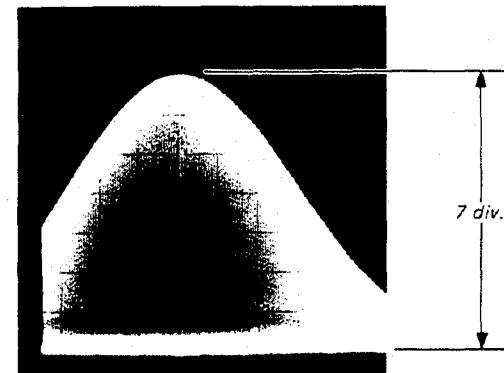
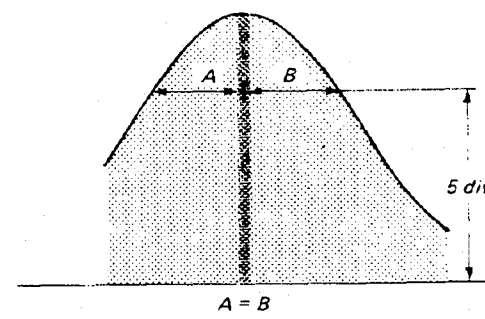
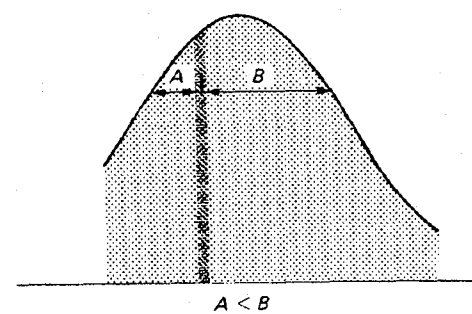


Fig. 19-1

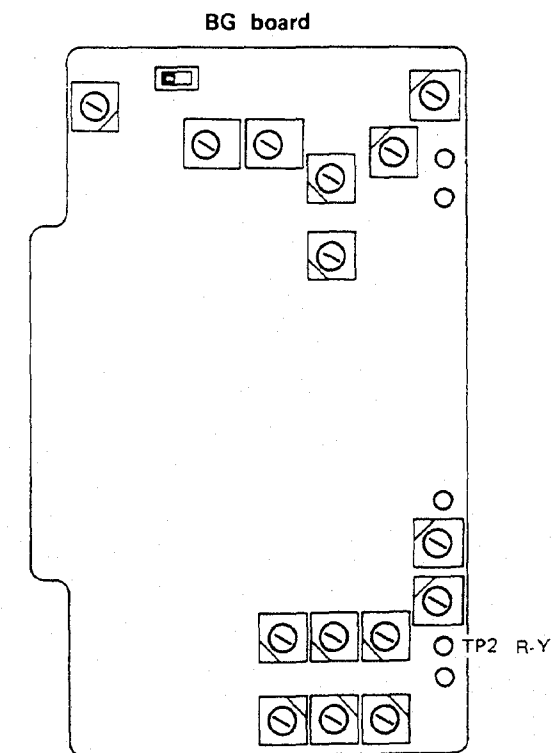
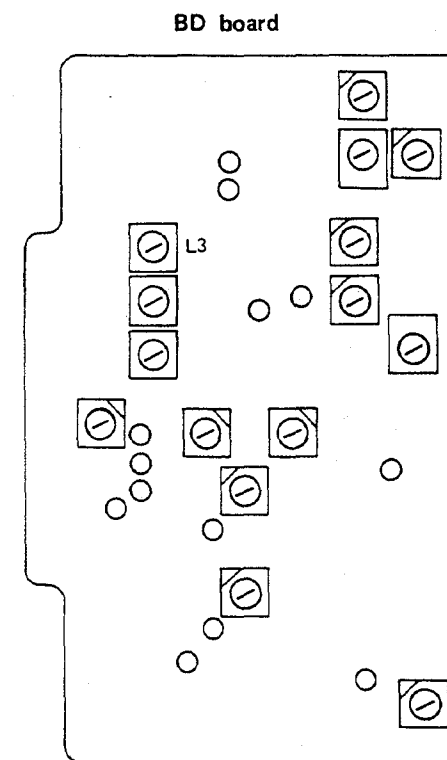


4. Adjust L3 on the BD board so that A is equal to B as shown in Fig. 19-2.

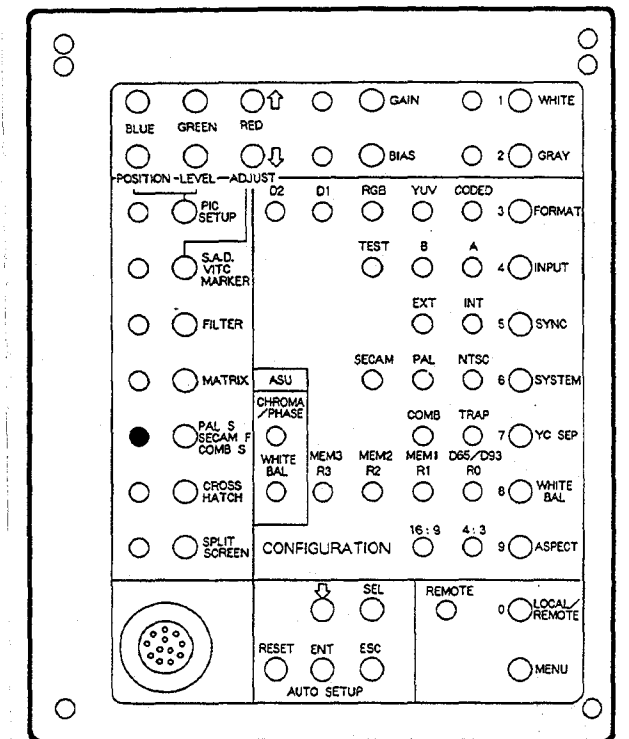


A is equal to B when the amplitude is 5 div.

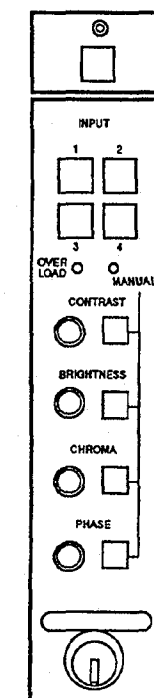
Fig. 19-2



## SUB CONTROL PANEL (HY board)



## FRONT PANEL (R)



## 20. BD (PAL) Board PHASE SHIFT ADJUSTMENT (BVM-1416P ONLY)

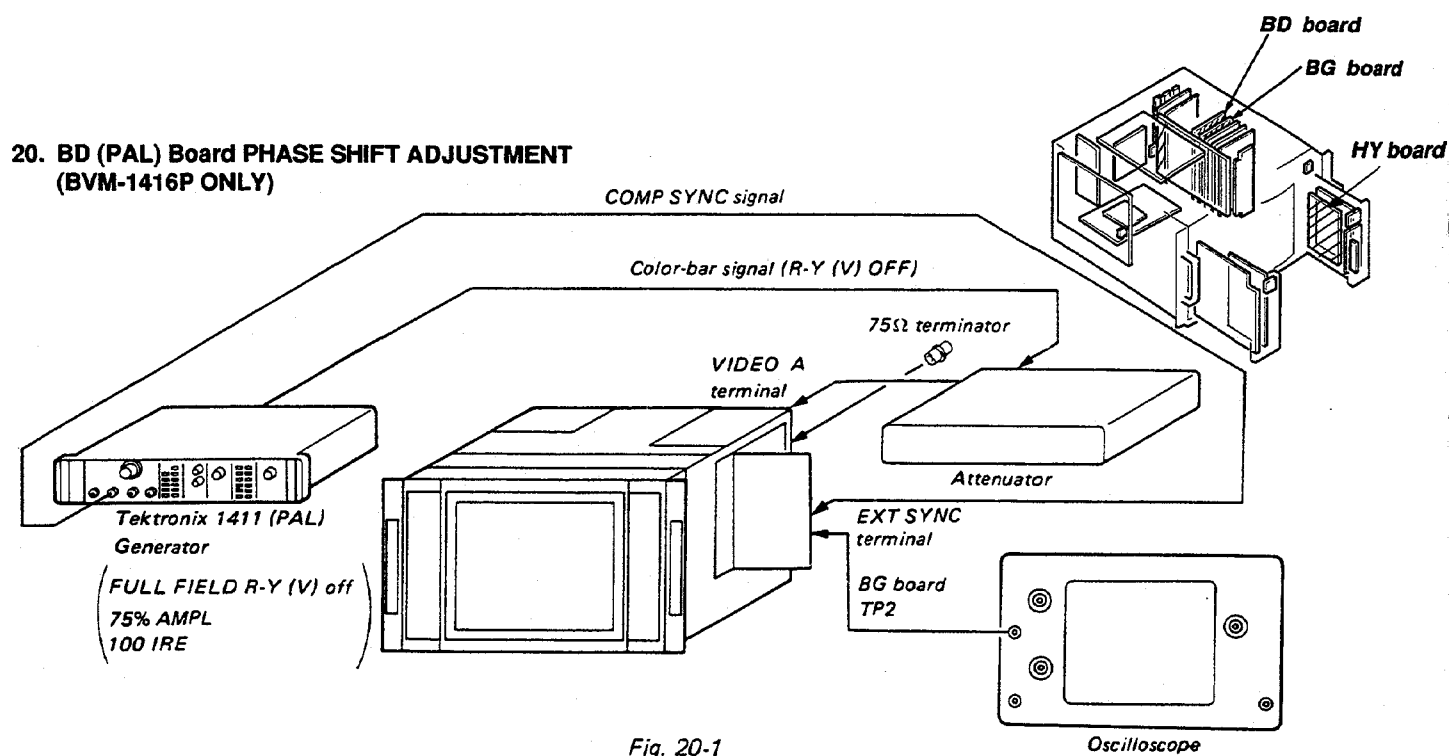


Fig. 20-1

- SYNC button (SUB CONTROL PANEL)..... EXT
- PAL S/SECAM F/COMB S button (SUB CONTROL PANEL)..... ON
- RV2 (BD BOARD).....MECHANICAL CENTER
- CV1 (BD BOARD).....MECHANICAL CENTER
- CV2 (BD BOARD).....MECHANICAL CENTER

1. Complete the connection as shown in Fig. 20-1.
2. Connect an oscilloscope to the TP2 on the BG board.
3. Make the waveform flat with the PHASE control of front panel (R) as shown in Fig. 20-2.

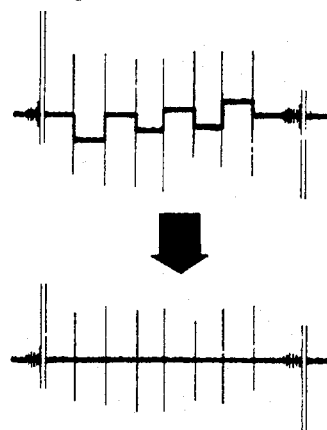
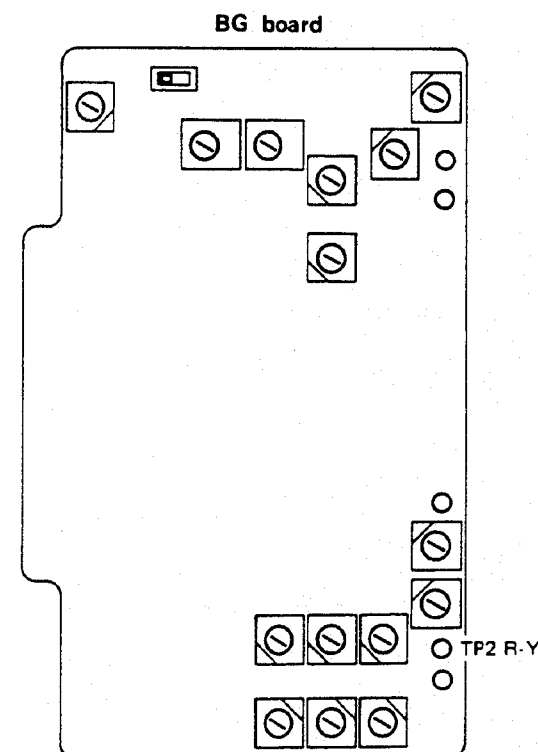
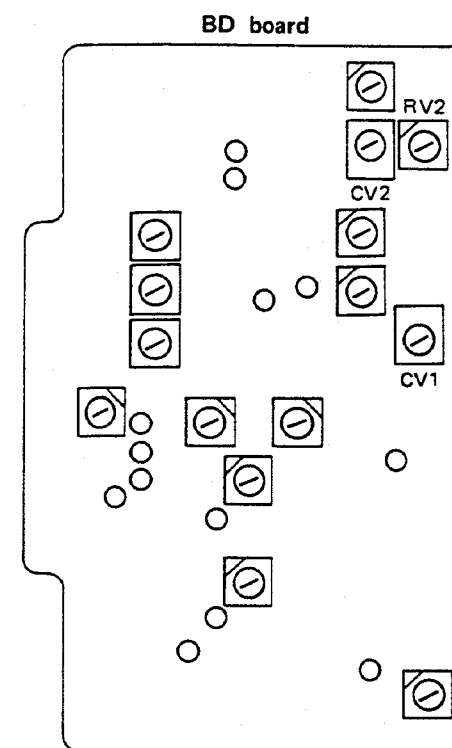
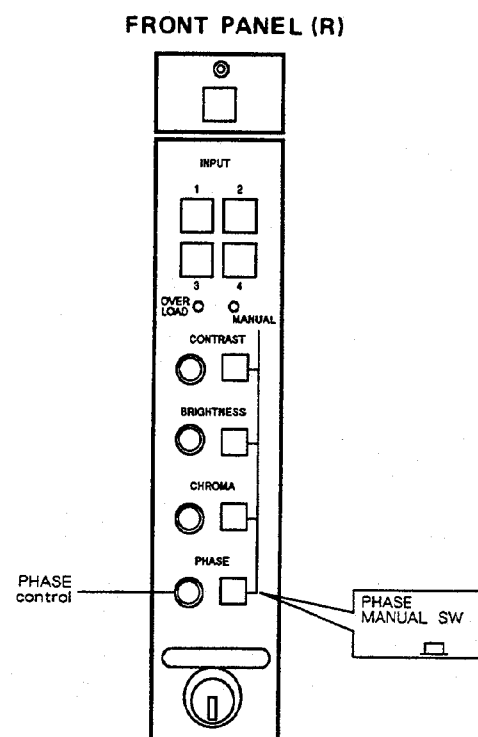
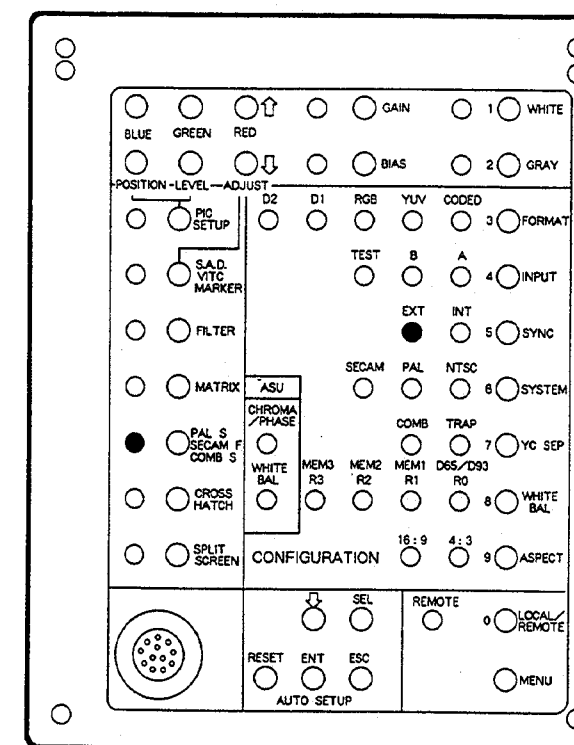


Fig. 20-2

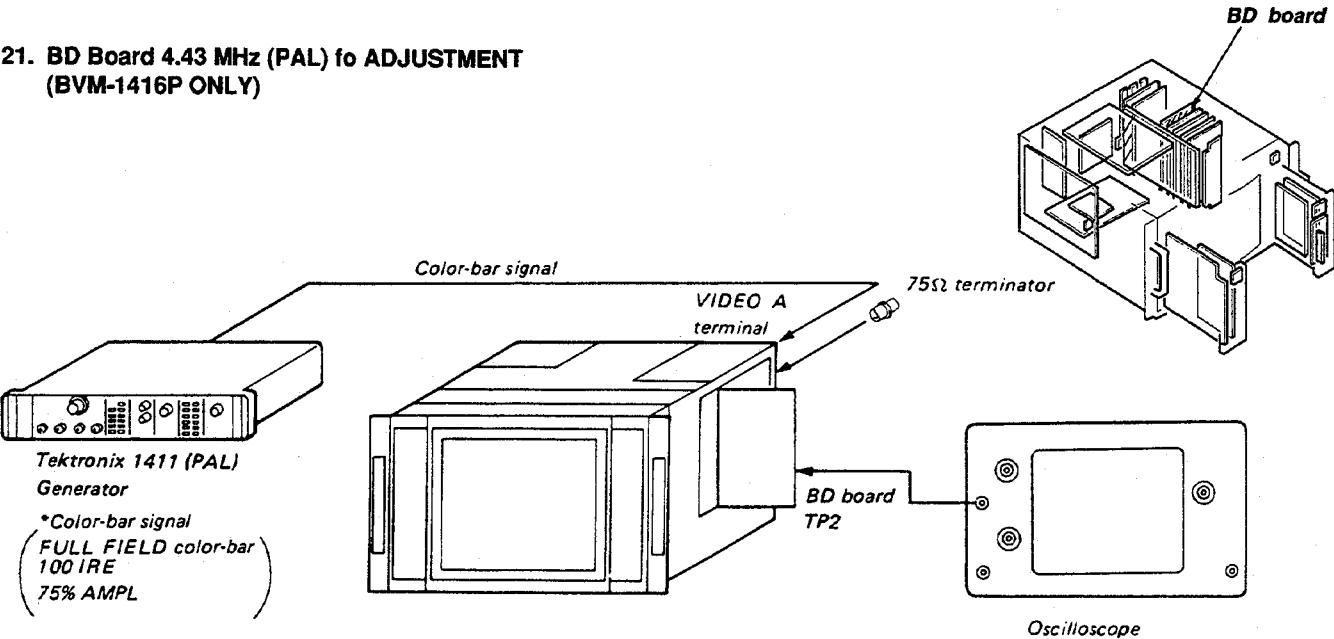
4. Attenuate the signal by 10dB by using attenuator.
5. Adjust RV2 on the BD board so that the output waveform becomes flat as shown in Fig. 20-2.
6. Restore the attenuator to 0dB.
7. Repeat the steps 3 to 5.



## SUB CONTROL PANEL (HY board)



21. BD Board 4.43 MHz (PAL) fo ADJUSTMENT  
(BVM-1416P ONLY)



- 1. Input color-bar signal to the VIDEO A terminal of the set.
- 2. Connect an oscilloscope to the TP2 of BD board.
- 3. Short-circuit between TP11, 12 of BD board with a jumper wire.
- 4. Adjust CV2 of BD board so that the output waveform is shifted slowly as shown in Fig. 21-1.
- 5. Turn off the power of this monitor, and disconnect TP11, 12 of BD board.

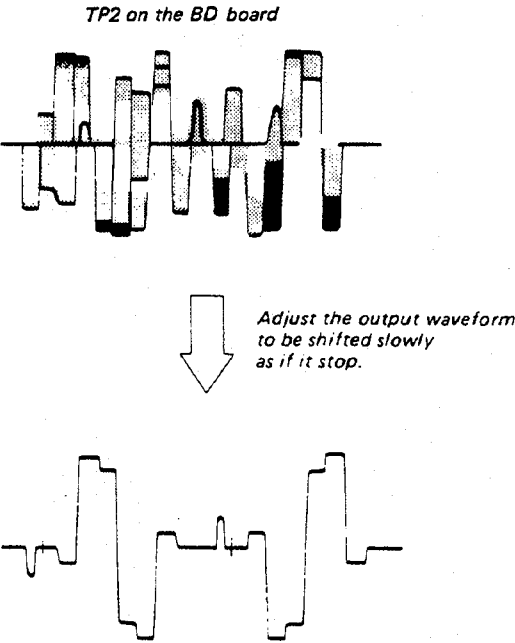
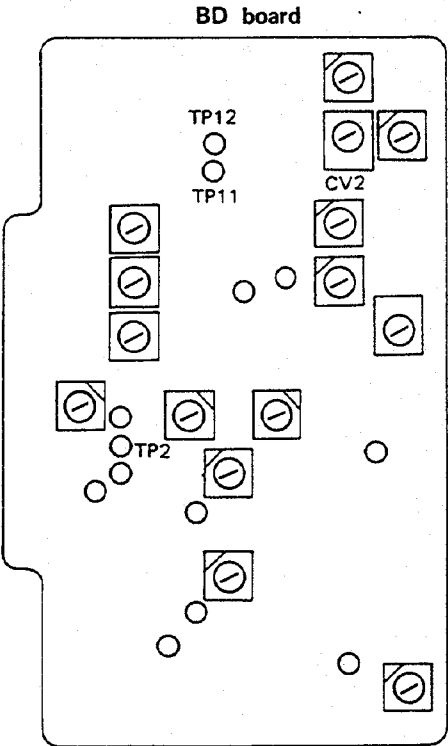
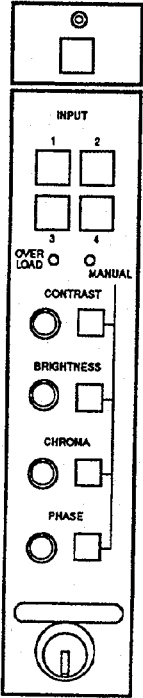


Fig. 21-1

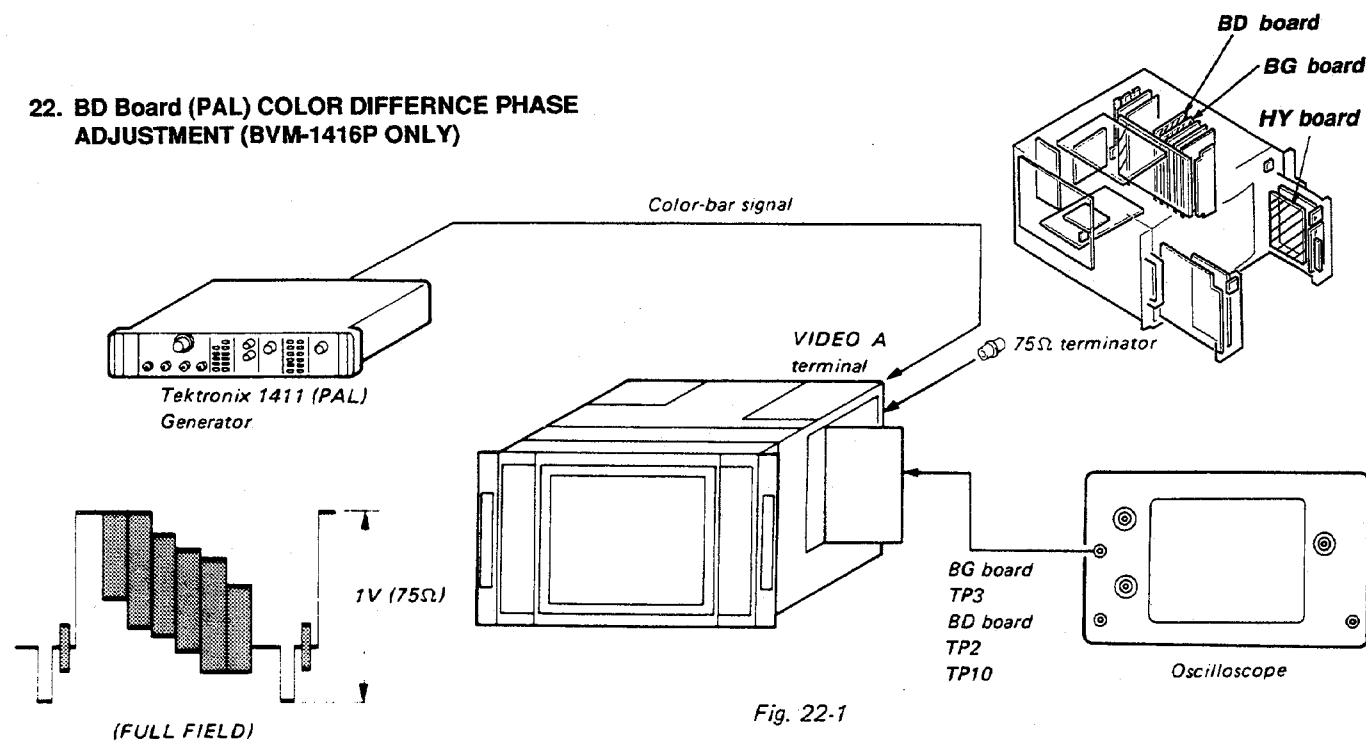


FRONT PANEL (R)





## 22. BD Board (PAL) COLOR DIFFERENCE PHASE ADJUSTMENT (BVM-1416P ONLY)

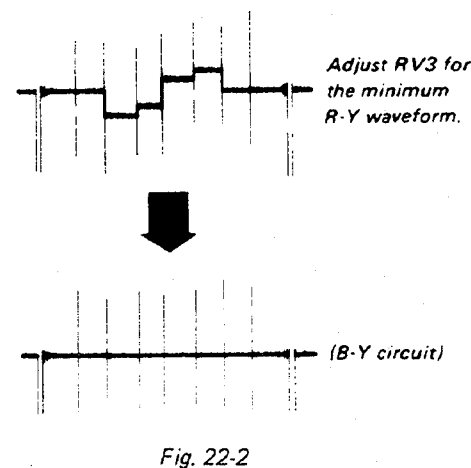
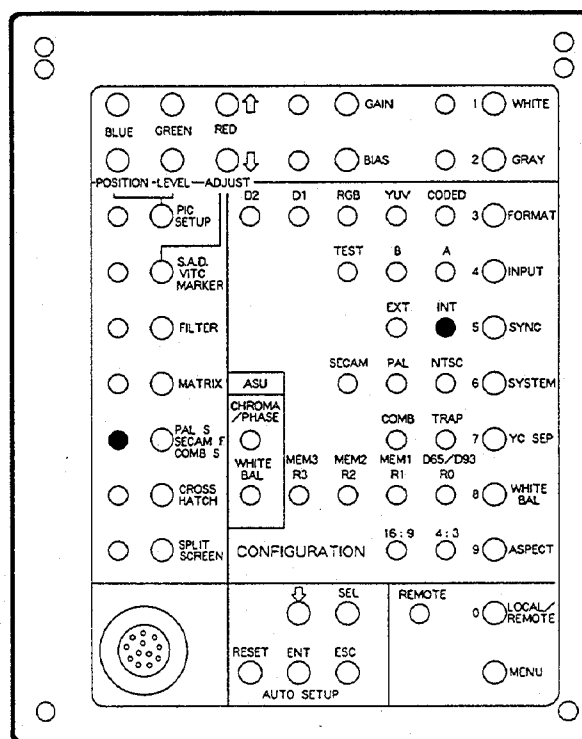


1. Complete the connections as shown in Fig. 22-1.
2. Turn on the power of this monitor. Set the INPUT switch to the 1 position, the SYNC switch to the INT position, and the PAL S/SECAM F/COMB S button to the ON.

### B-Y System Adjustment

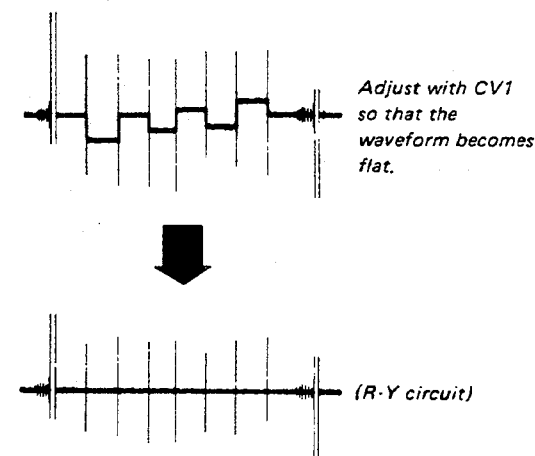
3. Connect the oscilloscope probe to TP3 on the BG board, and turn off the U (B-Y) signal of the signal generator.
4. Set the oscilloscope sensitivity to 20mV/DIV, and adjust RV8 on the BD board so that the output waveform is flat. (See Fig. 22-2.)

### SUB CONTROL PANEL (HY board)



### Quad Adjustment

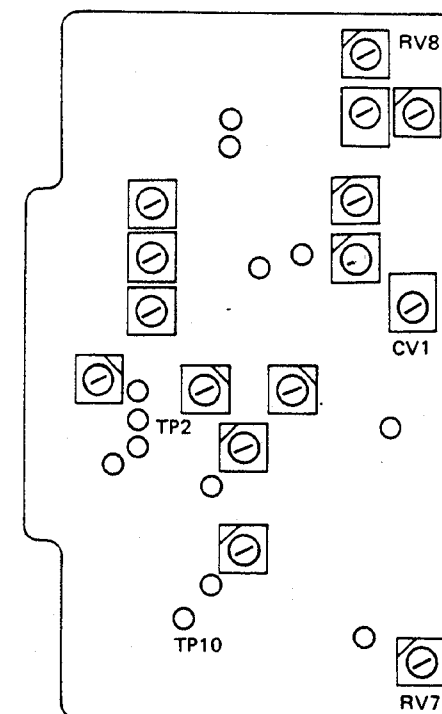
5. Connect the oscilloscope probe to TP2 on the BD board. Turn on the U signal of the signal generator, and turn off the V (R-Y) signal. Then adjust CV1 on the BD board so that the output waveform is flat. (See Fig. 22-3.)
6. Repeat the steps 3 to 6.



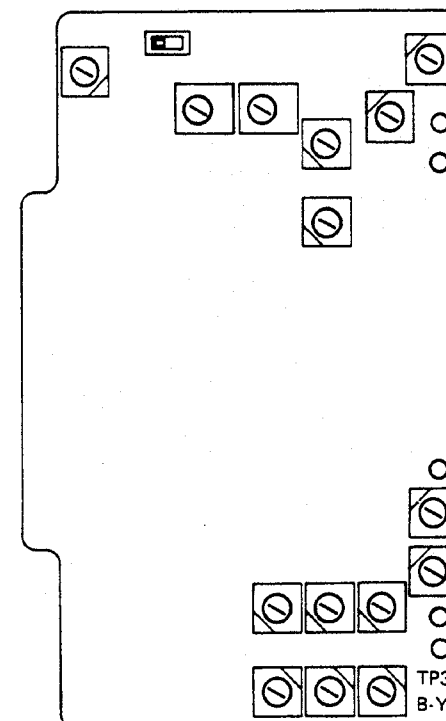
### PAL-D Phase Adjustment

7. Set the PAL S/SECAM F/COMB S button to the OFF and turn on the V signal of the signal generator, and turn off U signal.
8. Connect the oscilloscope probe to TP10 on the BD board.
9. Adjust RV7 on the BD board so that the output waveform is flat. (See Fig. 22-2.)
10. Finally, perform the adjustments of 3 and 4 by directly mounting the BD board to the set, without using the extension board.

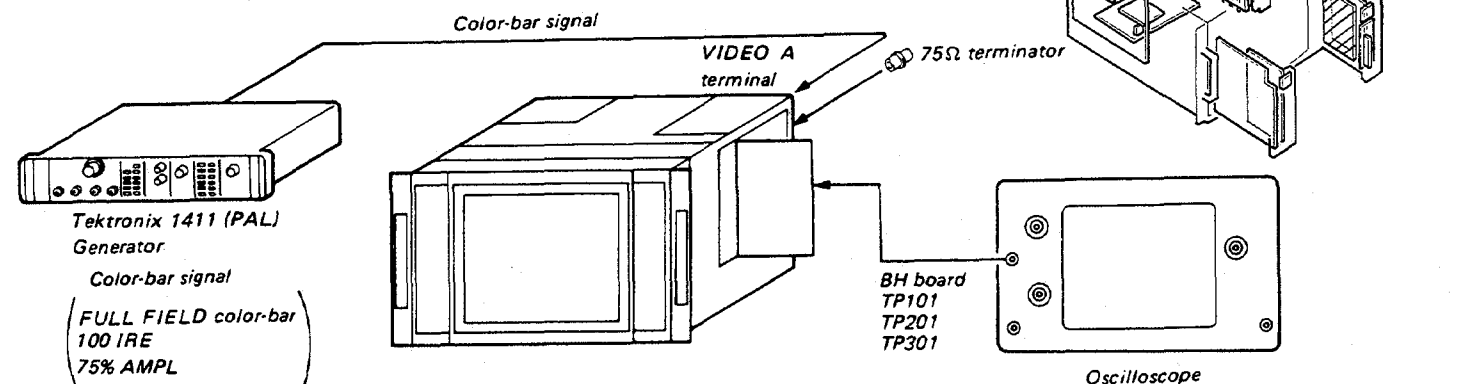
### BD board



### BG Board



### 23. BD Board (PAL) COLOR DIFFERENCE LEVEL ADJUSTMENT (BVM-1416P ONLY)



- PAL S/SECAM F/COMB S button (SUB CONTROL PANEL)..... ON

1. Input color-bar signal to the VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP101 of BH board.
3. Adjust RV3 of BD board so that the levels with \* is flat as shown in Fig. 23-1.

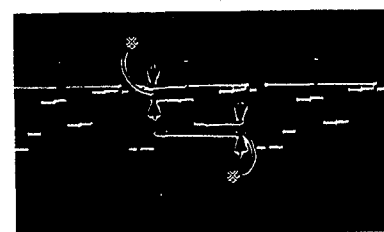


Fig. 23-1

\* Adjust the levels with \* to be flat respectively using RV3 of BD board.

4. Connect an oscilloscope to the TP301 of BH board.
5. Adjust RV4 of BD board so that the output waveform as shown in Fig. 23-2.

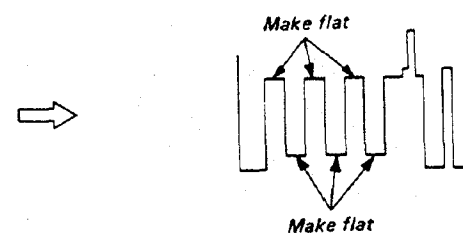
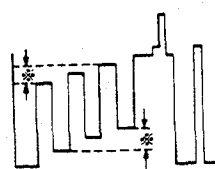
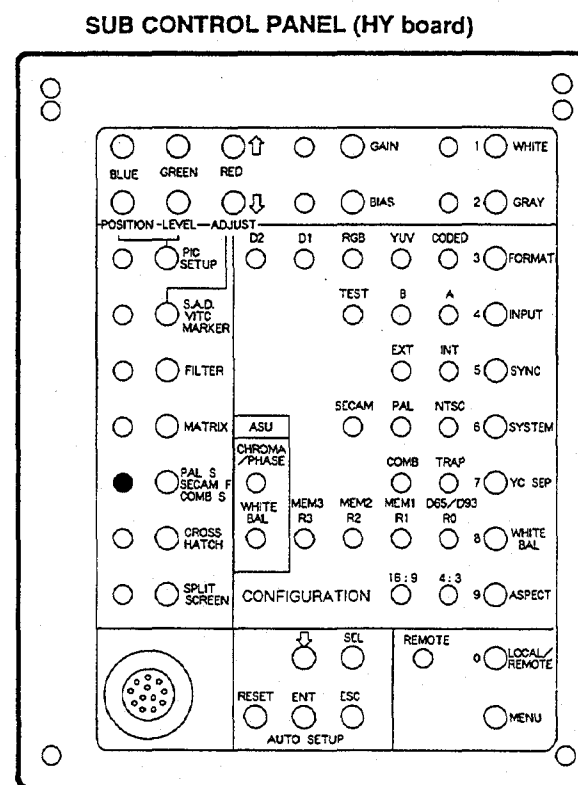


Fig. 23-2



6. Connect an oscilloscope to the TP201 of BH board.
7. Adjust RV4 and RV5 of BG board so that the INPUT waveform becomes flat as shown in Fig. 23-3.

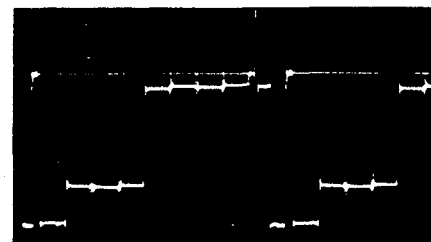


Fig. 23-3

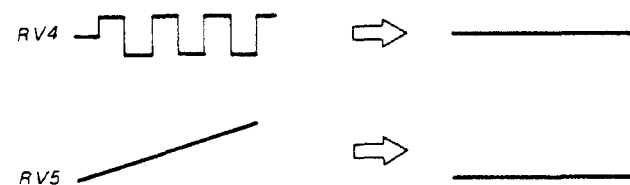
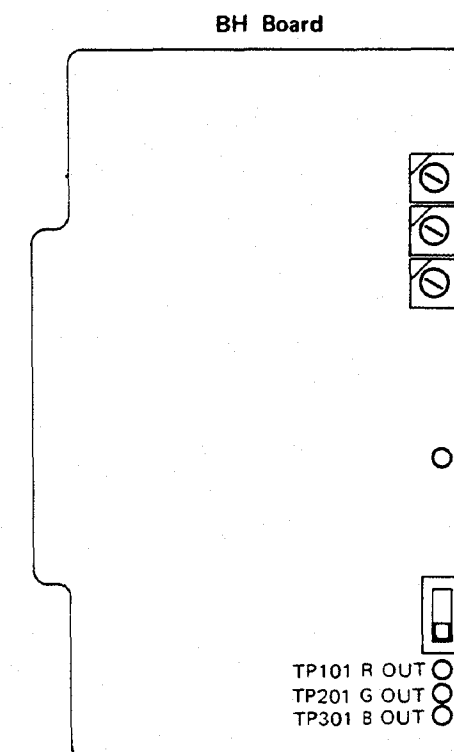
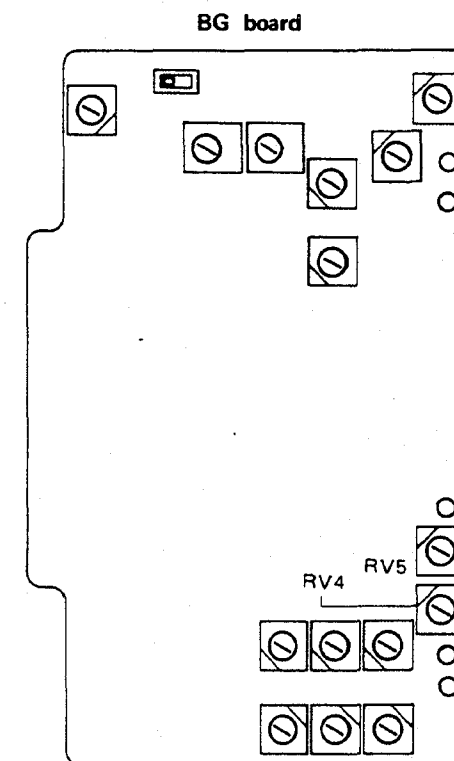
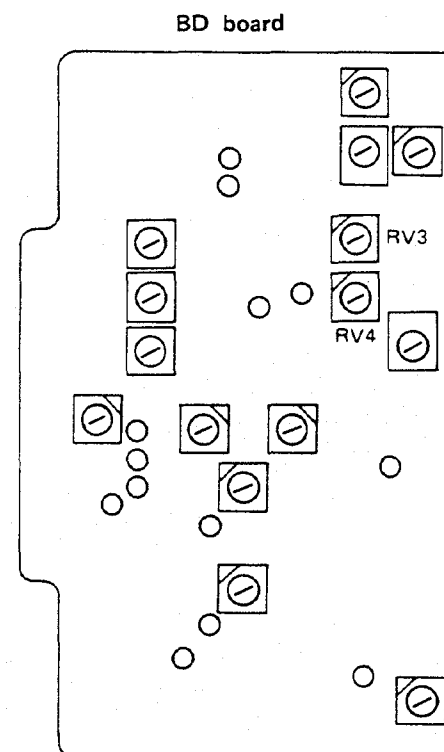
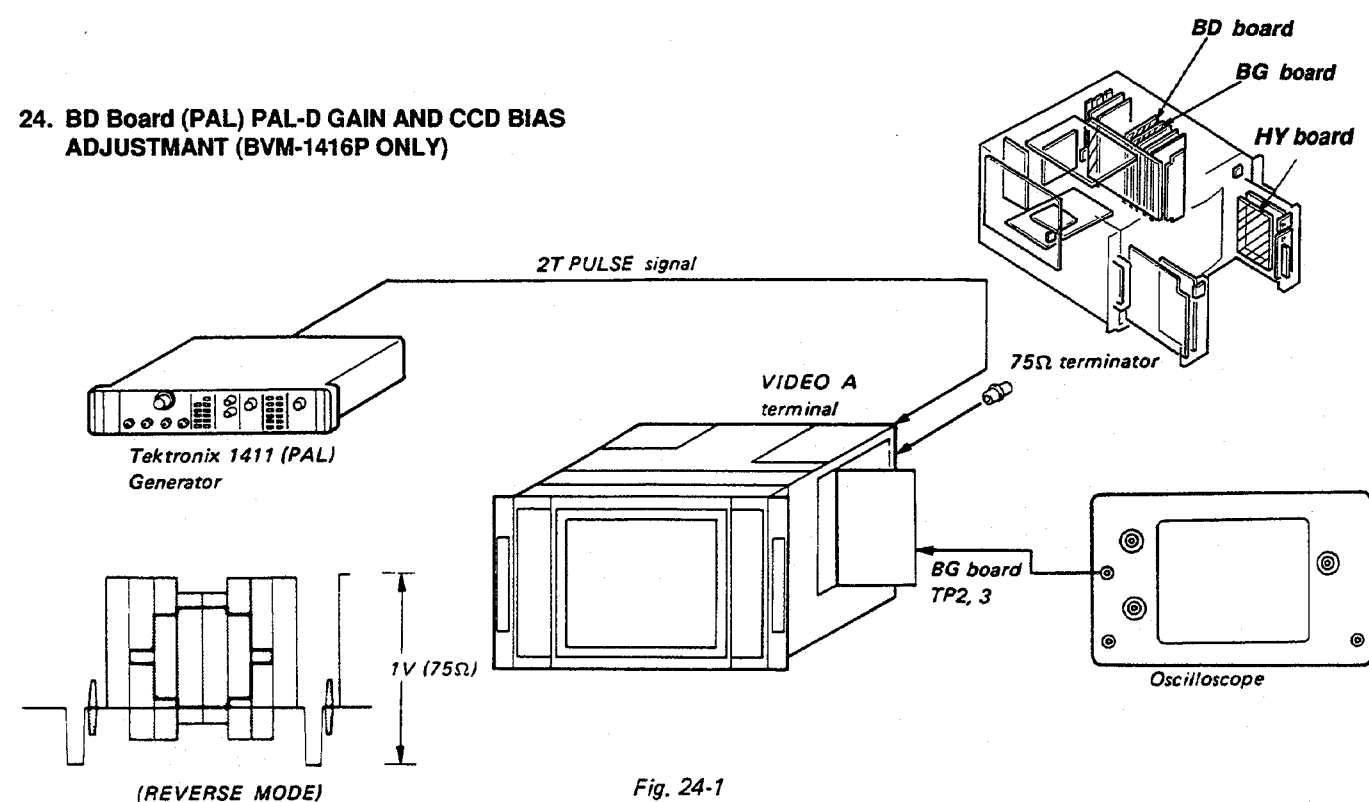


Fig. 23-3

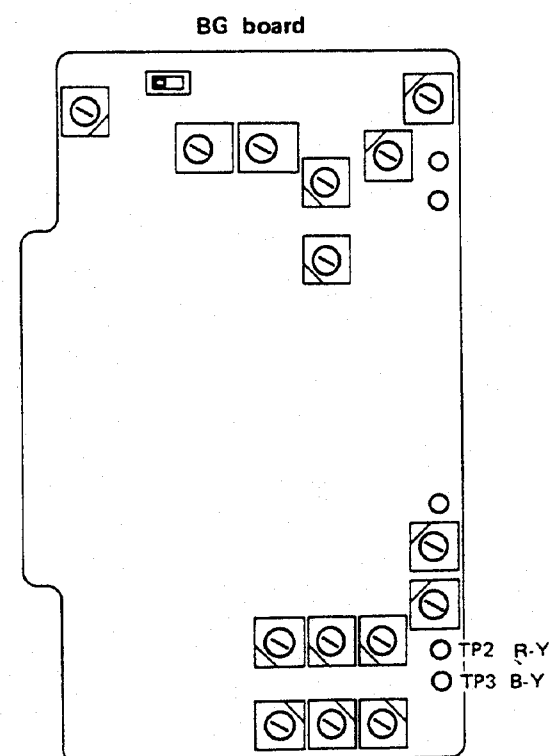
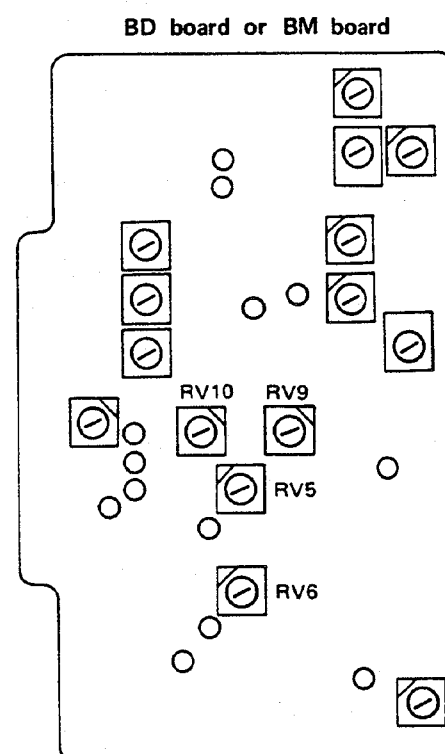
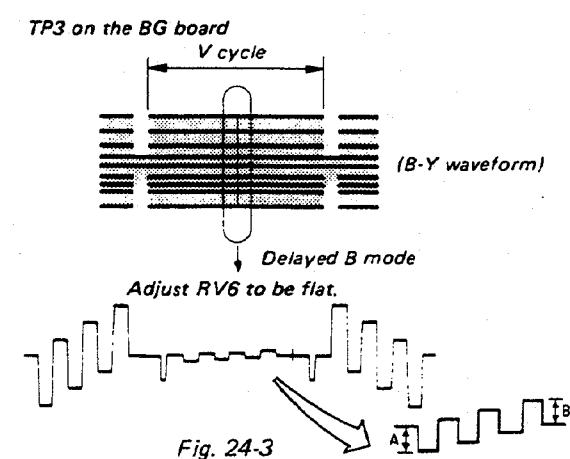
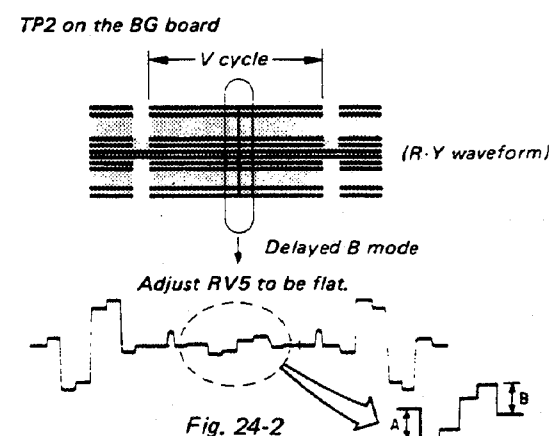


## 24. BD Board (PAL) PAL-D GAIN AND CCD BIAS ADJUSTMANT (BVM-1416P ONLY)

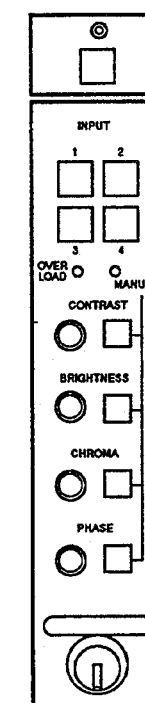


- PAL S/SECAM F/COMB S button (SUB CONTROL PANEL)..... OFF

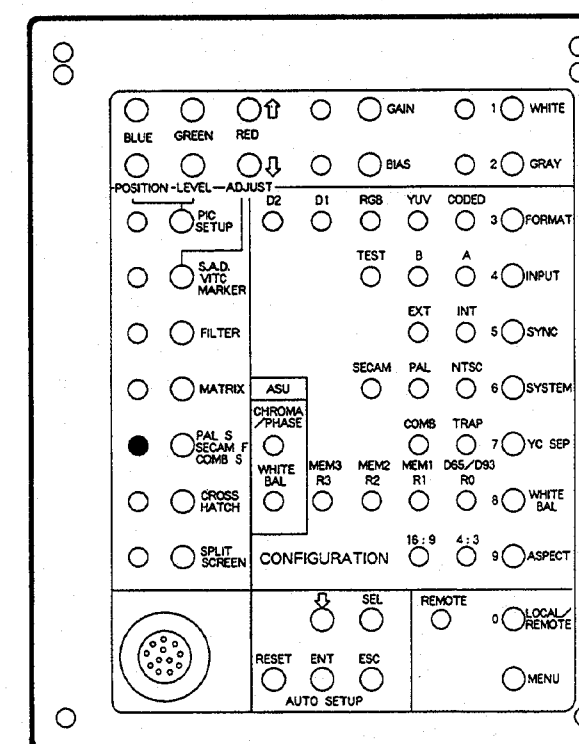
1. Complete the connection as shown in Fig. 24-1. Turn on the power of this monitor. Set the INPUT switch to the 1 position, and the SYNC switch to the INT position.
2. Connect the oscilloscope probe to TP2 on the BG board.
3. Turn RV5 and RV6 on the BD board fully clockwise.
4. By observing the waveform shown in Fig. 24-2, adjust RV9 on the BD board so that it becomes A=B.
5. Adjust RV5 on the BD board so that the waveform shown in Fig. 24-2 becomes flat.
6. Connect the probe of the oscilloscope to TP3 on the BG board and observe the section shown in Fig. 24-3.
7. Adjust RV10 on the BD board so that the waveform of the oscilloscope becomes A=B.
8. Adjust RV6 on the BD board so that the waveform shown in Fig. 24-3 becomes flat.



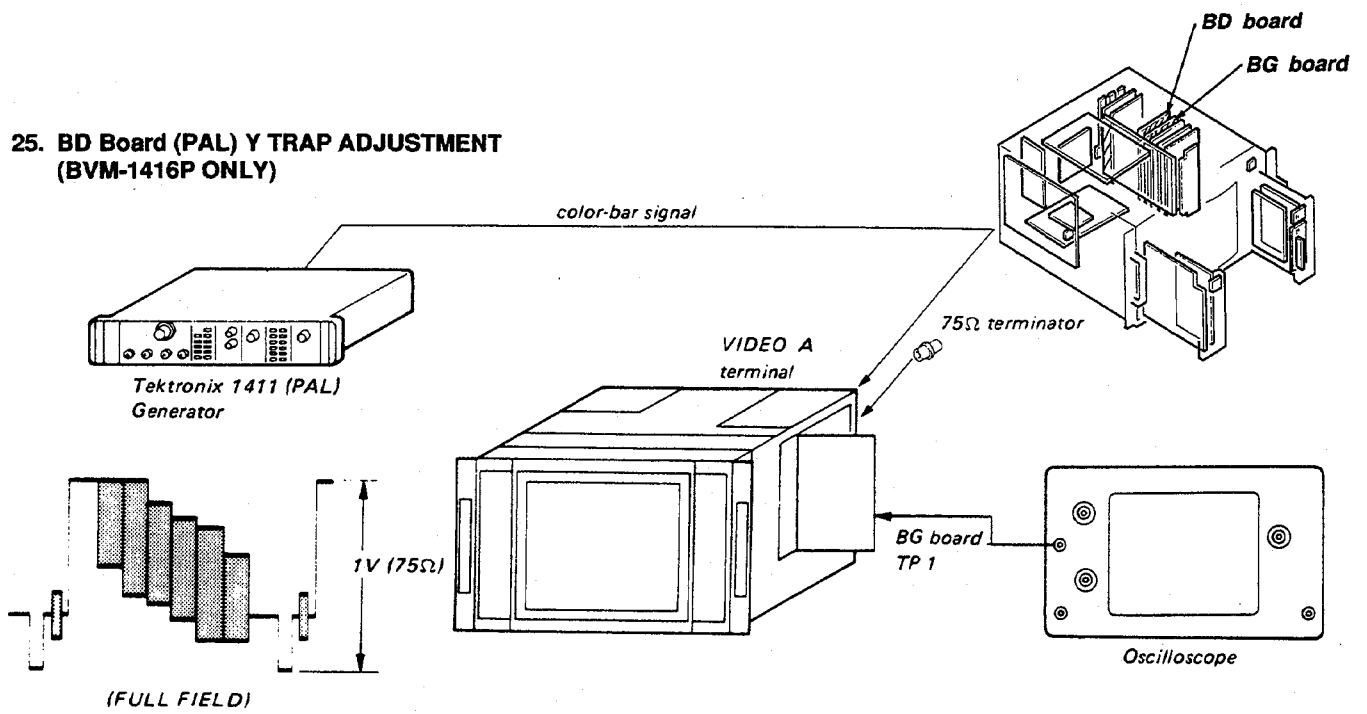
## FRONT PANEL (R)



## SUB CONTROL PANEL (HY board)



## 25. BD Board (PAL) Y TRAP ADJUSTMENT (BVM-1416P ONLY)



1. Input color-bar signal to VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP1 of BG board.
3. Adjust L1 of BD board so that 4.43 MHz (PAL) subcarrier is minimum as shown in Fig. 25-1.

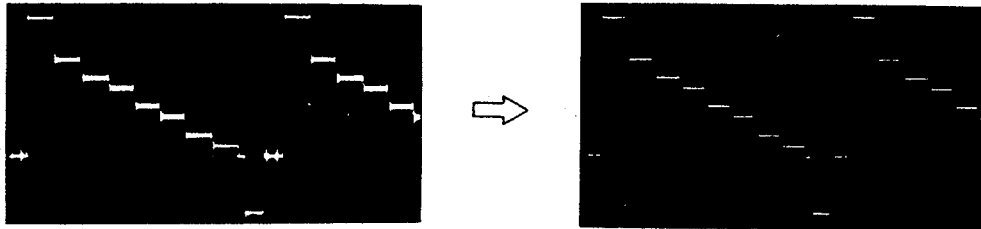
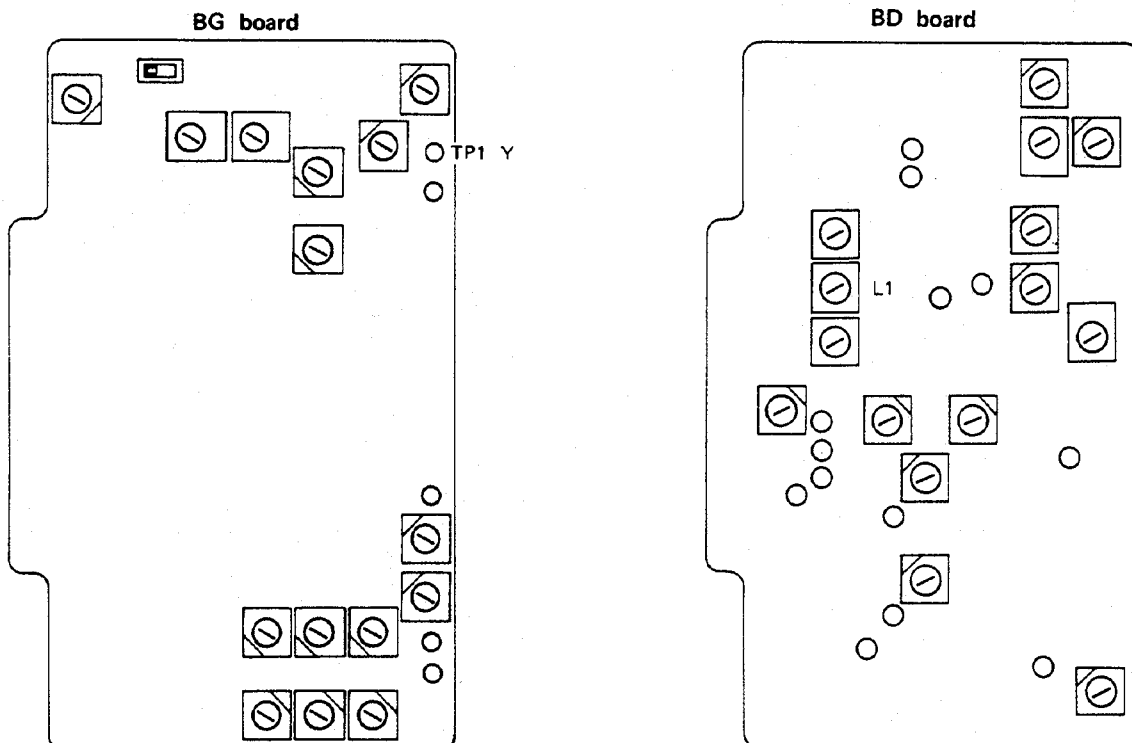
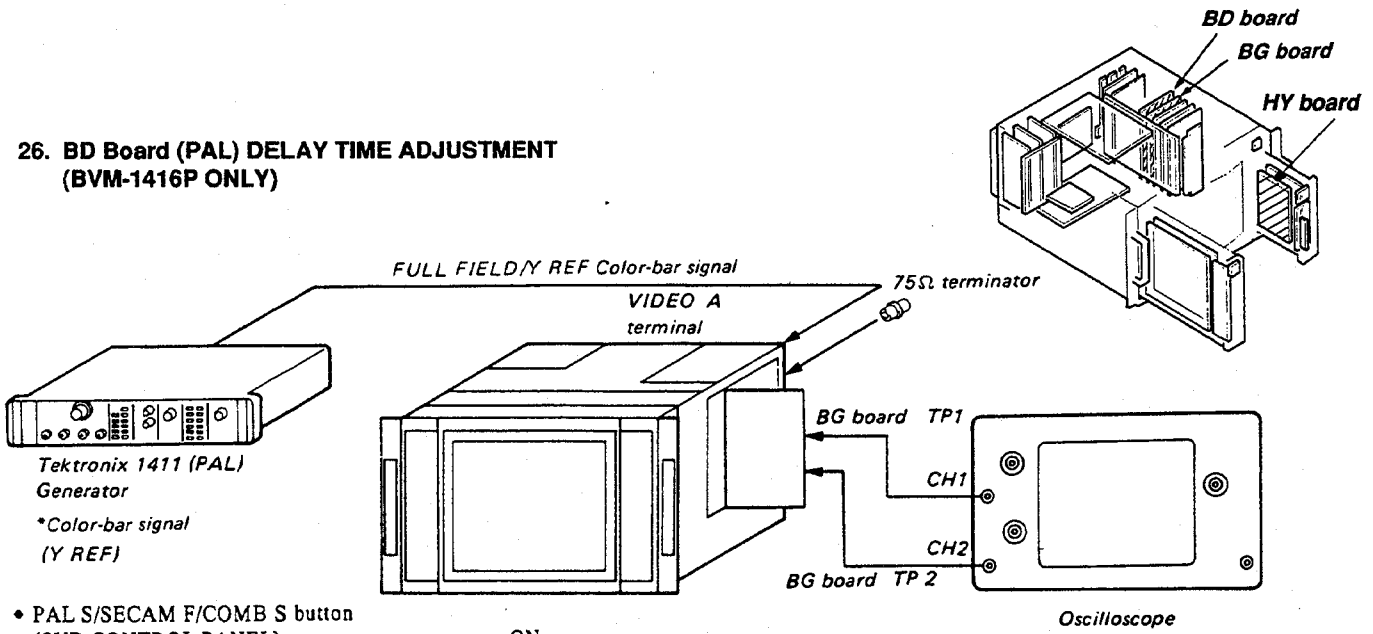


Fig. 25-1



## 26. BD Board (PAL) DELAY TIME ADJUSTMENT (BVM-1416P ONLY)



- PAL S/SECAM F/COMB S button (SUB CONTROL PANEL)..... ON
- 1. Input color-bar signal (FULL FIELD/Y REF) to the VIDEO A terminal of the set.
- 2. Connect an oscilloscope (CH-1 probe) to the TP1 of BG board and connect an oscilloscope (CH-2 probe) to the TP2 of BG board (VERT mode of the oscilloscope is CHOP).
- 3. Adjust RV1 of BD board so that the output waveform as shown in Fig. 26-1.

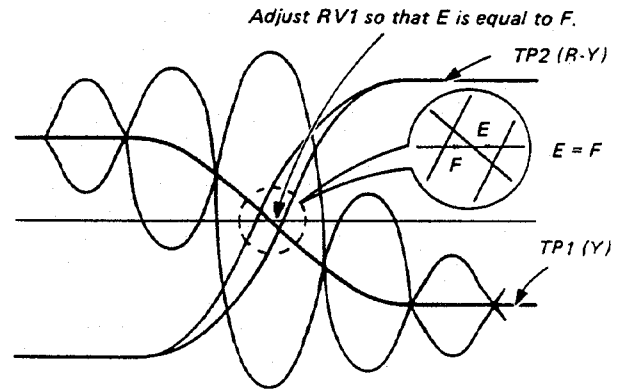
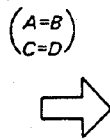
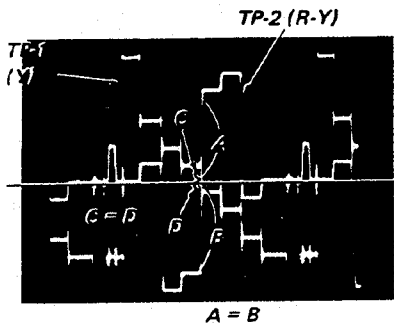
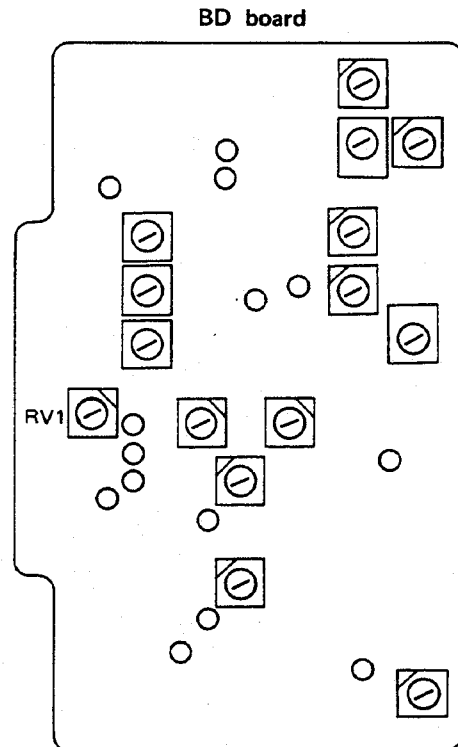
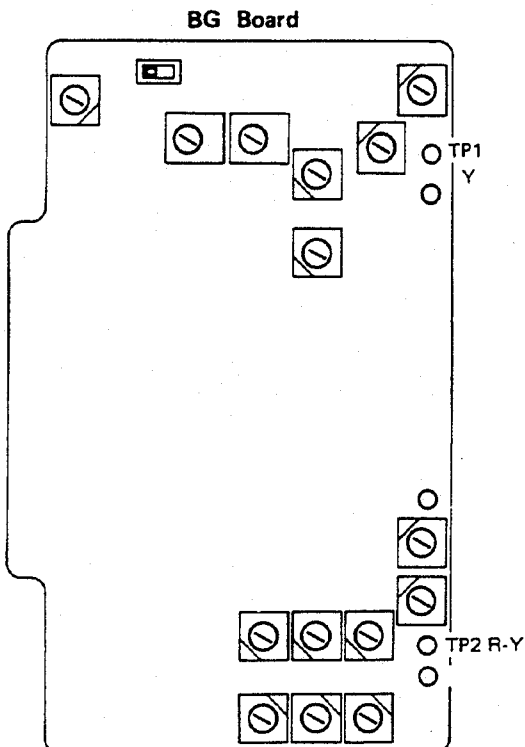
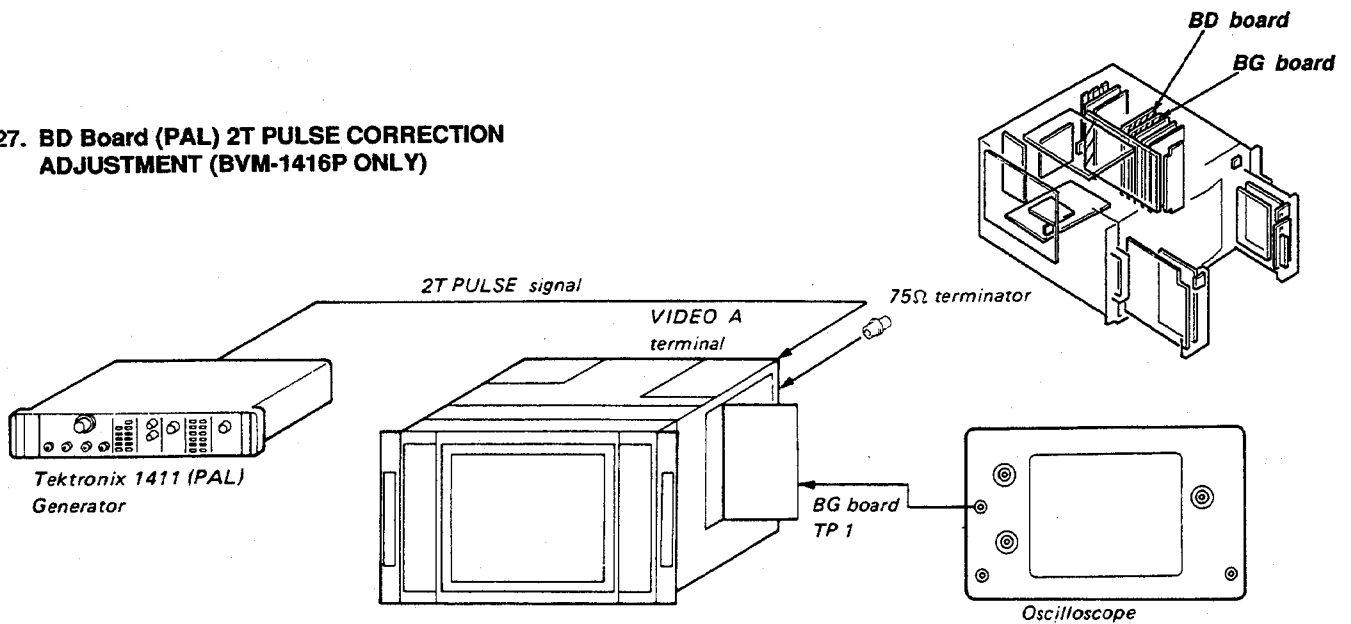


Fig. 26-1



## 27. BD Board (PAL) 2T PULSE CORRECTION ADJUSTMENT (BVM-1416P ONLY)



1. Input 2T pulse signal to VIDEO A terminal of the set.
2. Connect an oscilloscope to the TP1 of BG board.
3. Adjust L2 of BD board so that A is equal to B as shown in Fig. 27-1.
4. Change the input signal from 2T pulse to T pulse, and make sure the waveform balance is not lost extremely as shown in Fig. 27-1.

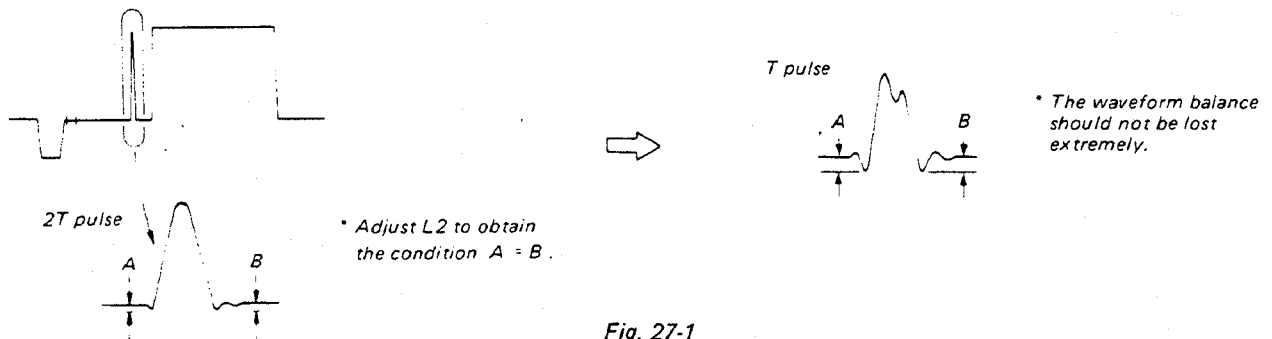
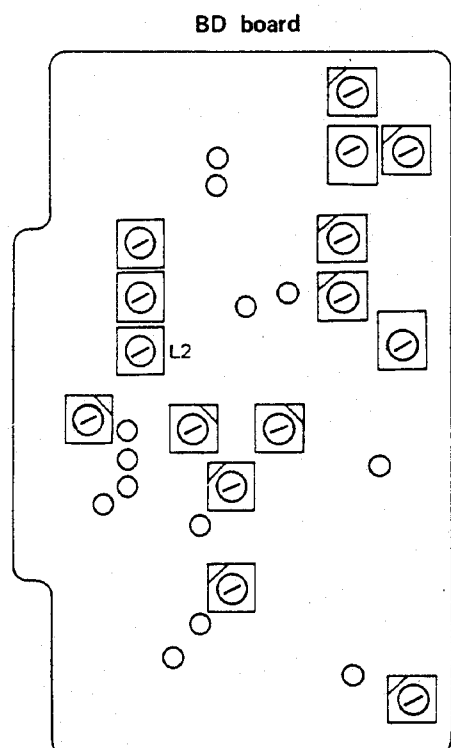
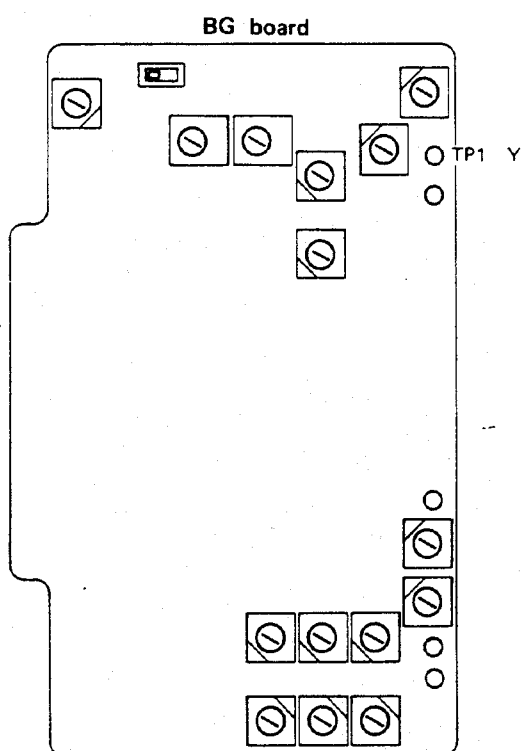
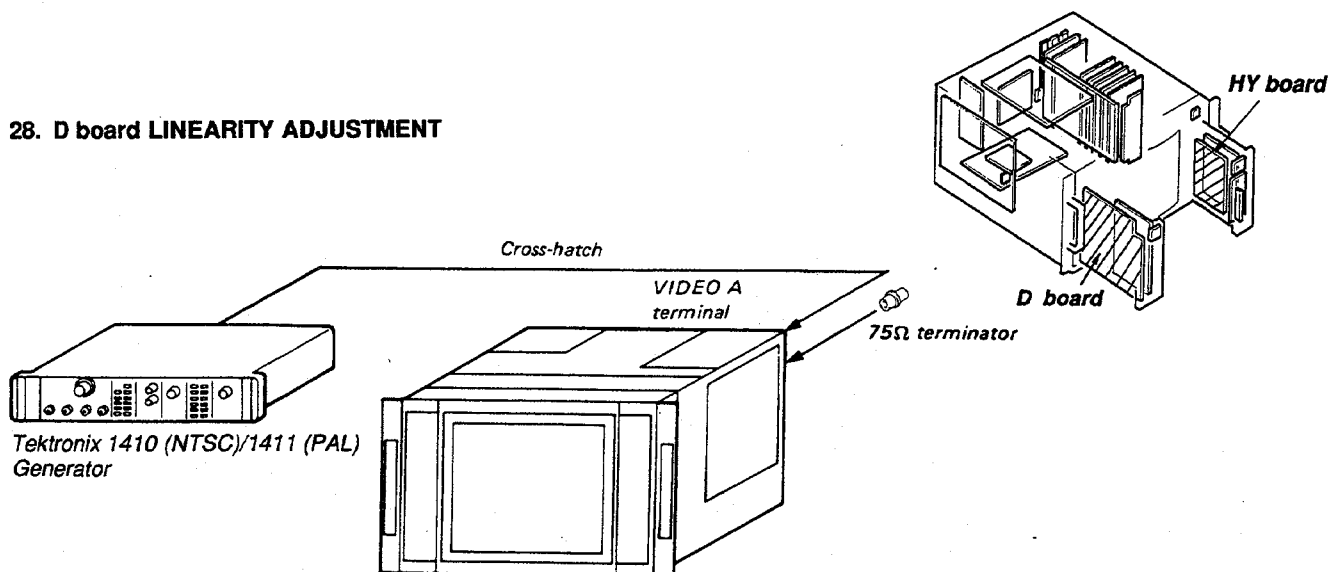


Fig. 27-1



## 28. D board LINEARITY ADJUSTMENT



ASPECT button (SUB CONTROL PANEL) ..... 4:3

### • Vertical Pincushion Adjustment

1. Input only the H line of cross-hatch signal.
2. Minimize the X.BOW distortion with X.BOW (RV11) on the D board as shown in third from the top of Fig 28-1.
3. Minimize the T and B pincushion distortion gain with T.B.P (RV12) on the D board as shown in second from the top of Fig 28-1.

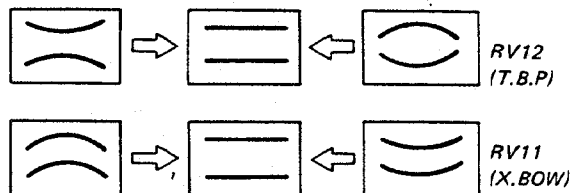
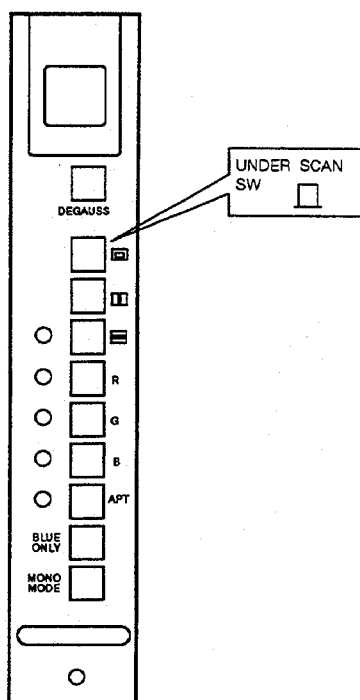
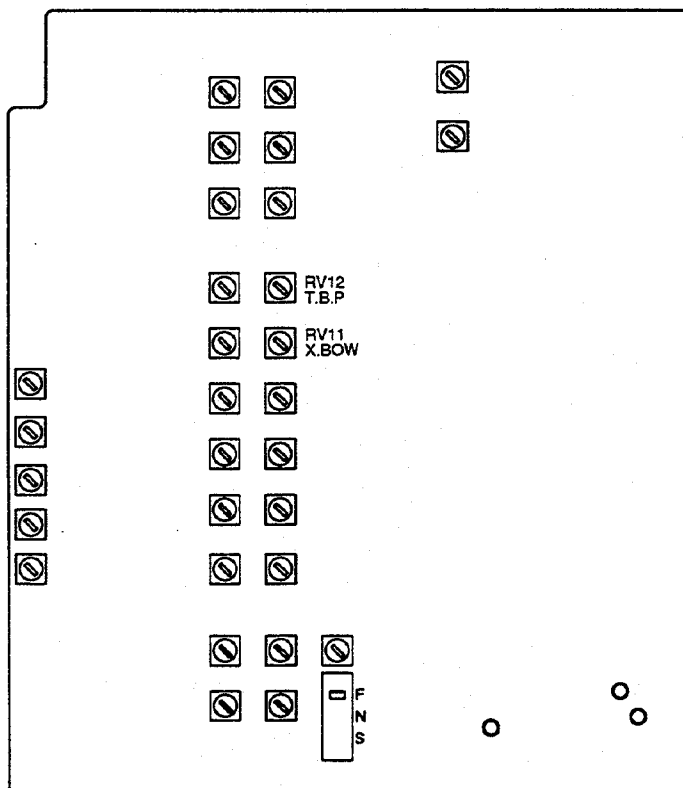


Fig. 28-1

### FRONT PANEL (L)



### D board



### • Vertical Lineality Adjustment

1. Input only the H line of cross-hatch signal.
2. Adjust V center with V.CENTER (RV10) at the left side of control panel.
3. Adjust the balance of V lineality with V.L.B (RV9) on the D board as shown in Fig 28-2.
4. Adjust the gain of V lineality with V.L.G (RV8) on the D board as shown in Fig 28-3.
5. Adjust the V.HEIGHT with V.H.N (RV3) on the D board.
6. Set the SCAN selector to UNDER position.

RV9 ..... V LIN BALANCE

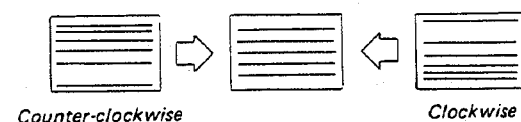


Fig. 28-2

RV8 ..... V LIN GAIN

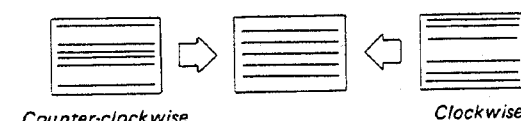


Fig. 28-3

### Side Pincushion Adjustment

1. Input only the V line of cross-hatch signal.
2. Minimize the Y.BOW distortion with Y.BOW (RV13) on the D board as shown in Fig 28-6.
3. Minimize the side pincushion distortion with S.P.N (RV5) on the D board as shown in Fig 28-4.
4. Minimize the side pincushion tilt distortion with S.P.T (RV7) on the D board as shown in Fig 28-5.
5. Set the SCAN selector to UNDER position.
6. Minimize the side pincushion distortion with S.P.U (RV6) on the D board as shown in Fig 28-4.

RV5 (S.P.N)  
RV6 (S.P.U)

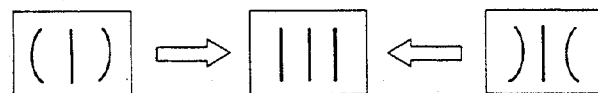


Fig. 28-4

RV7 (S.P.T)

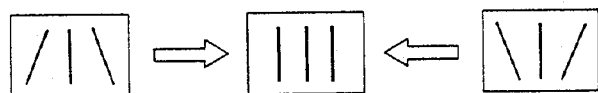


Fig. 28-5

RV13 (Y.BOW)

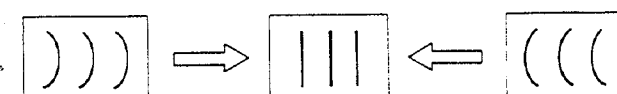


Fig. 28-6

### • Horizontal Lineality Adjustment

1. Input only the V line of cross-hatch signal.
2. Adjust the horizontal centering with H CENTER (RV14) at the left side of control panel.
3. Adjust the balance of H.lineality with H.L.B (RV28) on the D board as shown in Fig 28-7 "Change to horizontal".
4. Adjust the gain of H.lineality with H.L.G (RV27) on the D board as shown in Fig 28-8 "Change to horizontal".
5. Adjust the H.WIDTH with H.W.N (RV1) on the D board.
6. Set the SCAN selector to UNDER position.
7. Adjust the H.WIDTH with H.W.U (RV2) on the D board.

RV28 (H.L.B)

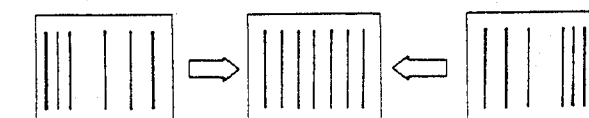


Fig. 28-7

RV27 (H.L.G)

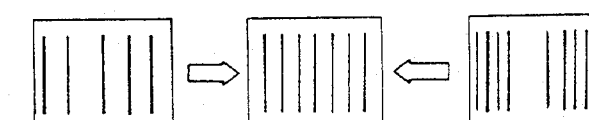
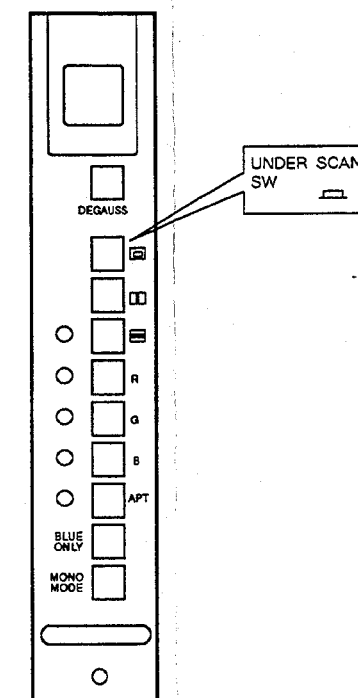
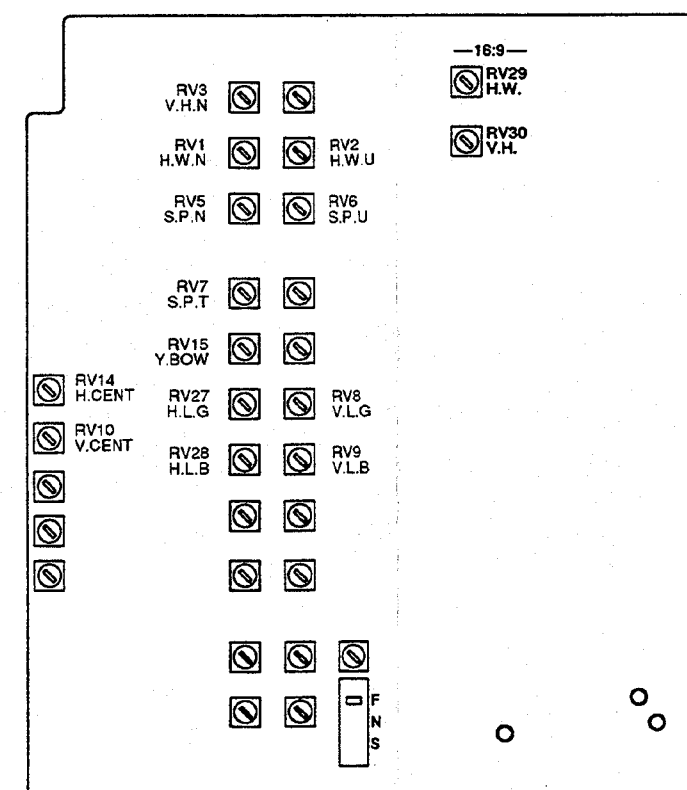


Fig. 28-8

FRONT PANEL(L)

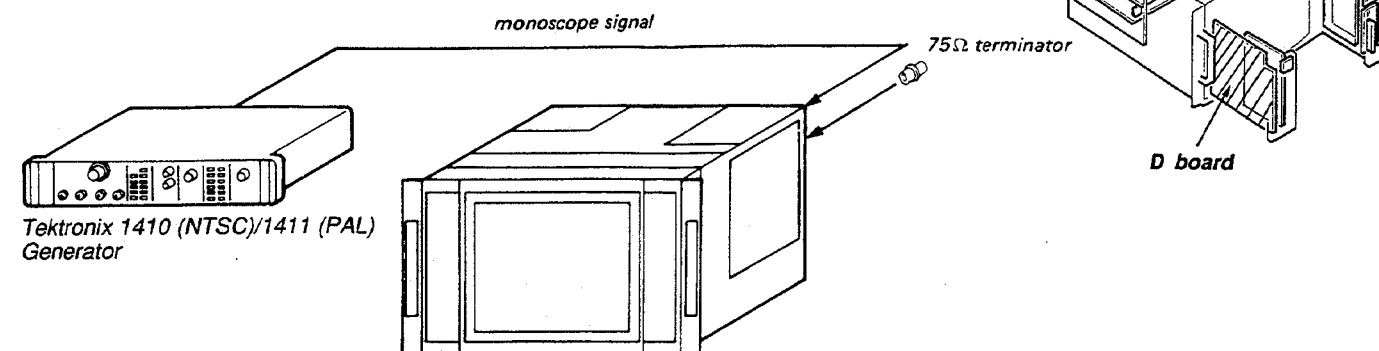


D board





## 29. D board LINEARITY ADJUSTMENT



### • H. OSC Free-run Adjustment

1. Set the SYNC selector to EXT.
2. Adjust H.FREQ. (RV25) on the D board until the picture movement is still or slow.

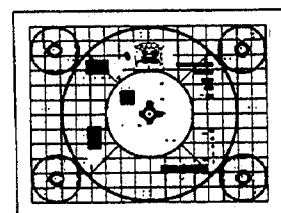


Fig. 29-1

3. Adjust H.PHASE (RV24) on the D board for both sides of raster width without signal component coincidence.

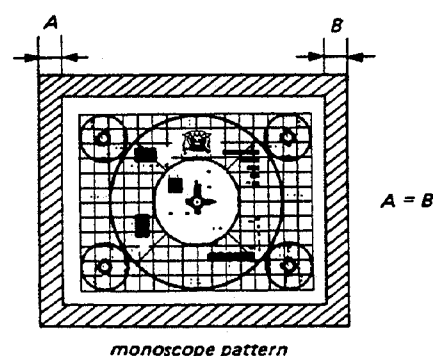


Fig. 29-3

### • Horizontal Phase and Horizontal Blanking Adjustments

1. Set the SCAN selector to UNDER position.
2. Turn the horizontal blanking controls H. BLK. R (RV23) fully clockwise and H. BLK. L (RV22) fully counterclockwise. (When the raster at both sides of screen are not appear completely, turn H.W.U (RV2) until obtaining the raster.)

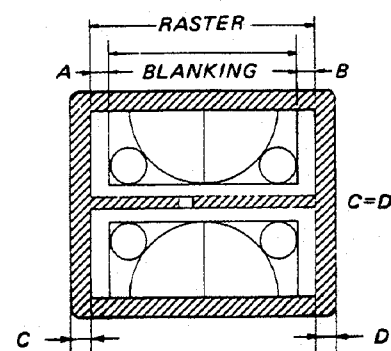


Fig. 29-2

4. Adjust H.BLK.R/H.BLK.L (RV23 and RV22) on the D board so that the raster width without signal component become half.

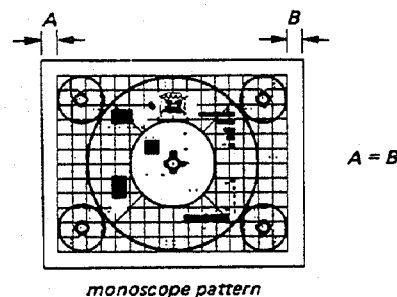
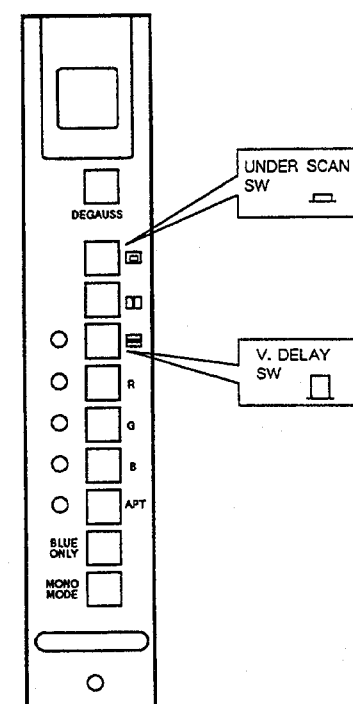
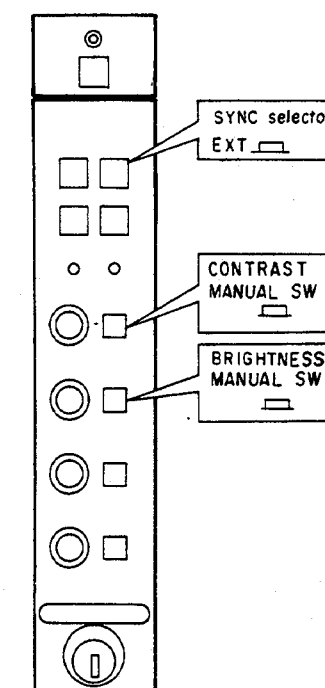


Fig. 29-4

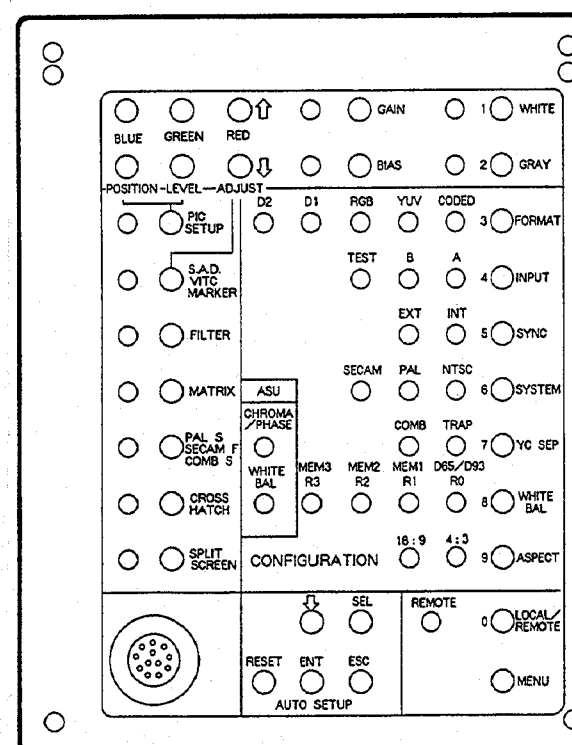
### FRONT PANEL (L)



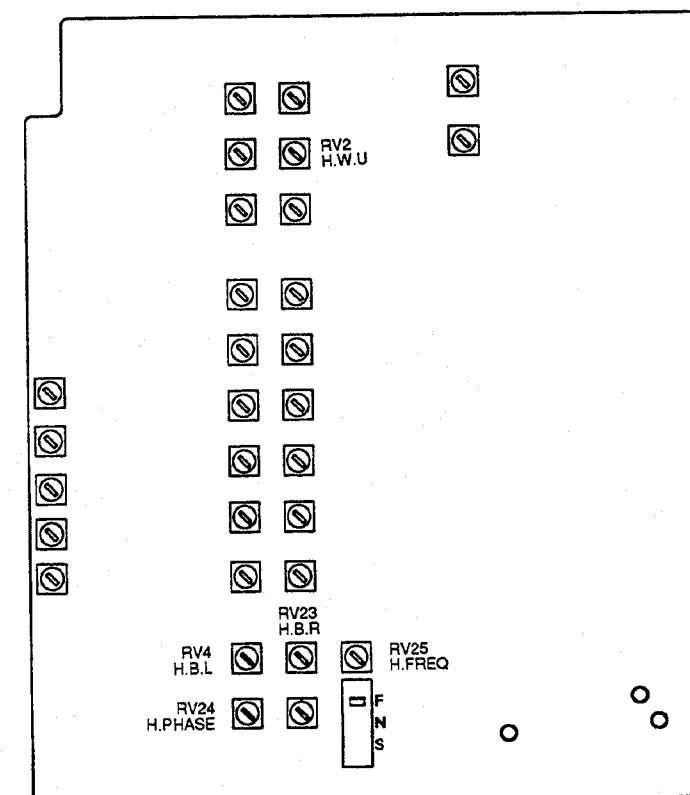
### FRONT PANEL (R)



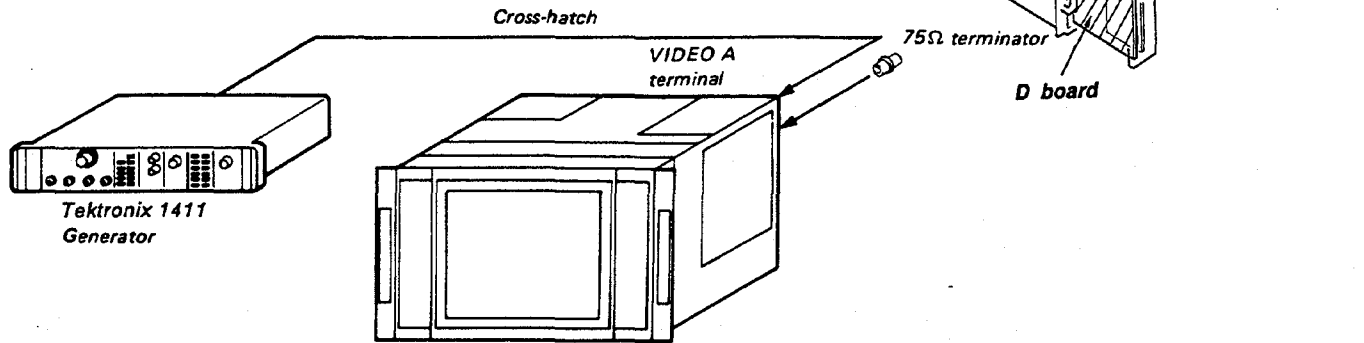
### SUB CONTROL PANEL (HY board)



### D board



### 30. D Board LINEARITY ADJUSTMENT OF 16:9 ASPECT PICTURE



• ASPECT button (SUB CONTROL PANEL) ..... 16:9

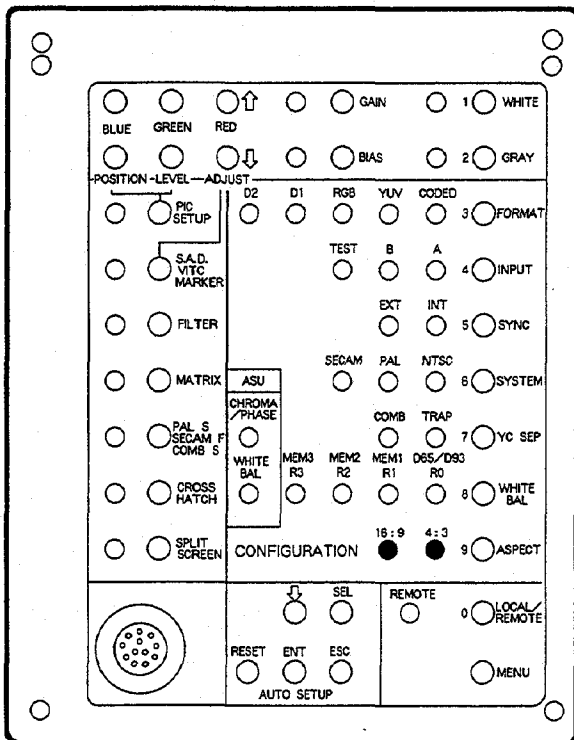
#### •Vertical Lineality Adjustment

1. Adjust the H. WIDTH with H. W (RV29) on the D board.

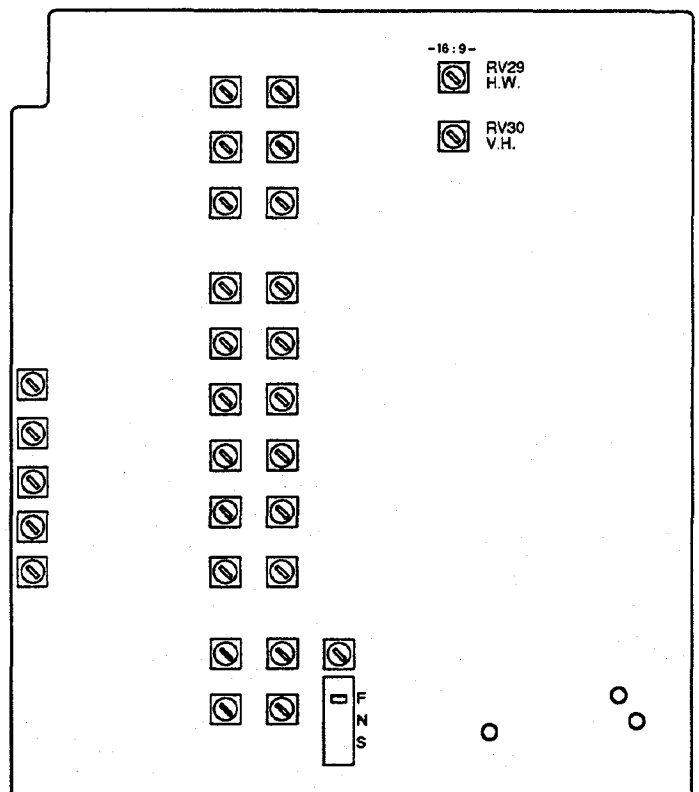
#### •Horizontal Lineality Adjustment

1. Adjust the V. HEIGHT with V. H (RV30) on the D board.

SUB CONTROL PANEL (HY board)



D board



## BLOCK DIAGRAMS      BLOCK DIAGRAMS

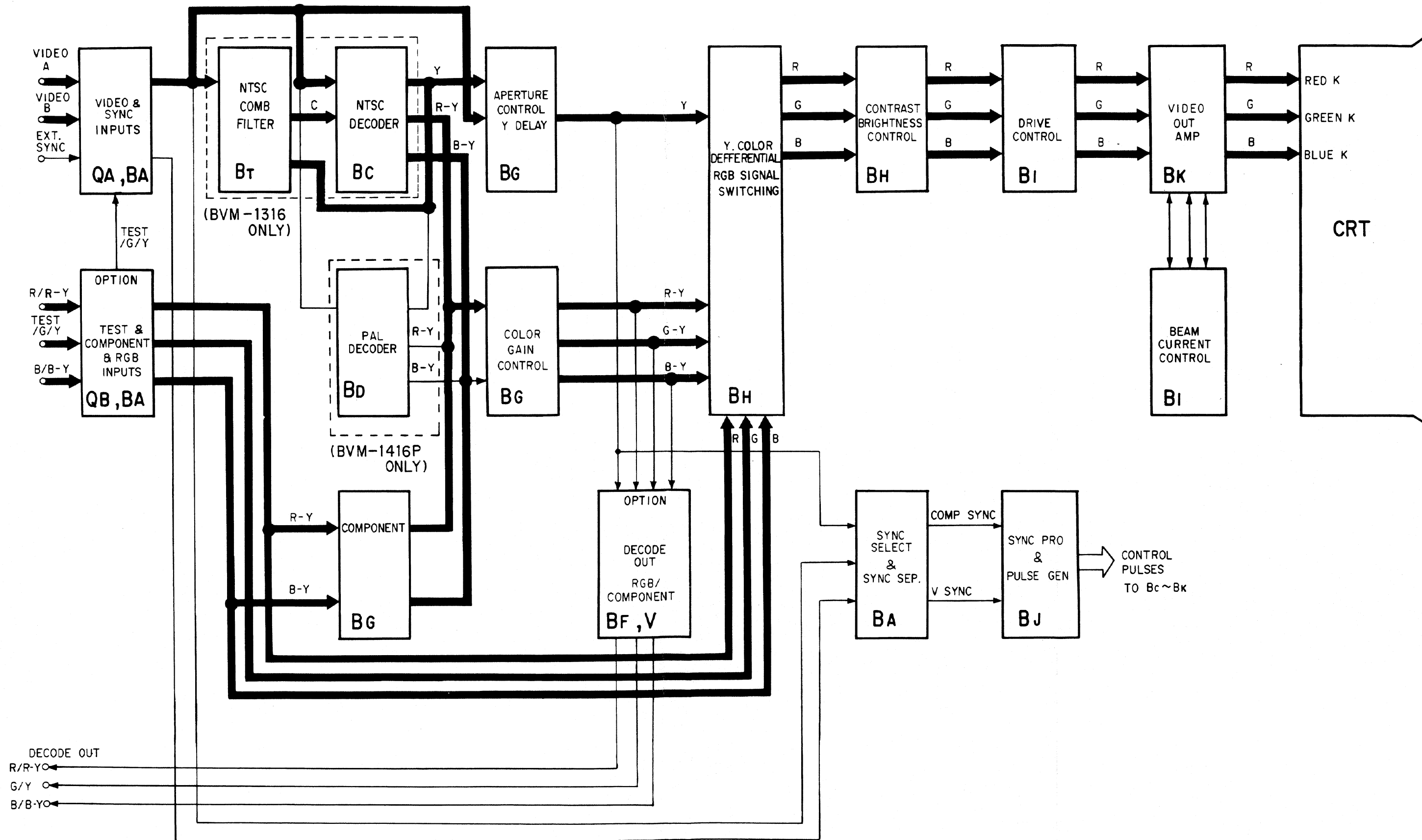
## SECTION 5

## DIAGRAMS

### 5-1. BLOCK DIAGRAM

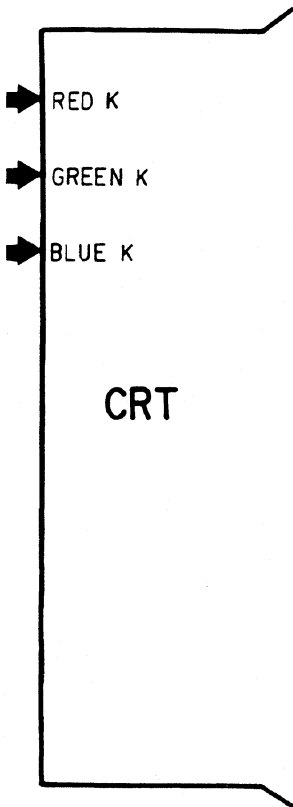
### SIGNAL PROCESSING BLOCK DIAGRAM

COMPOSITE VIDEO/Y



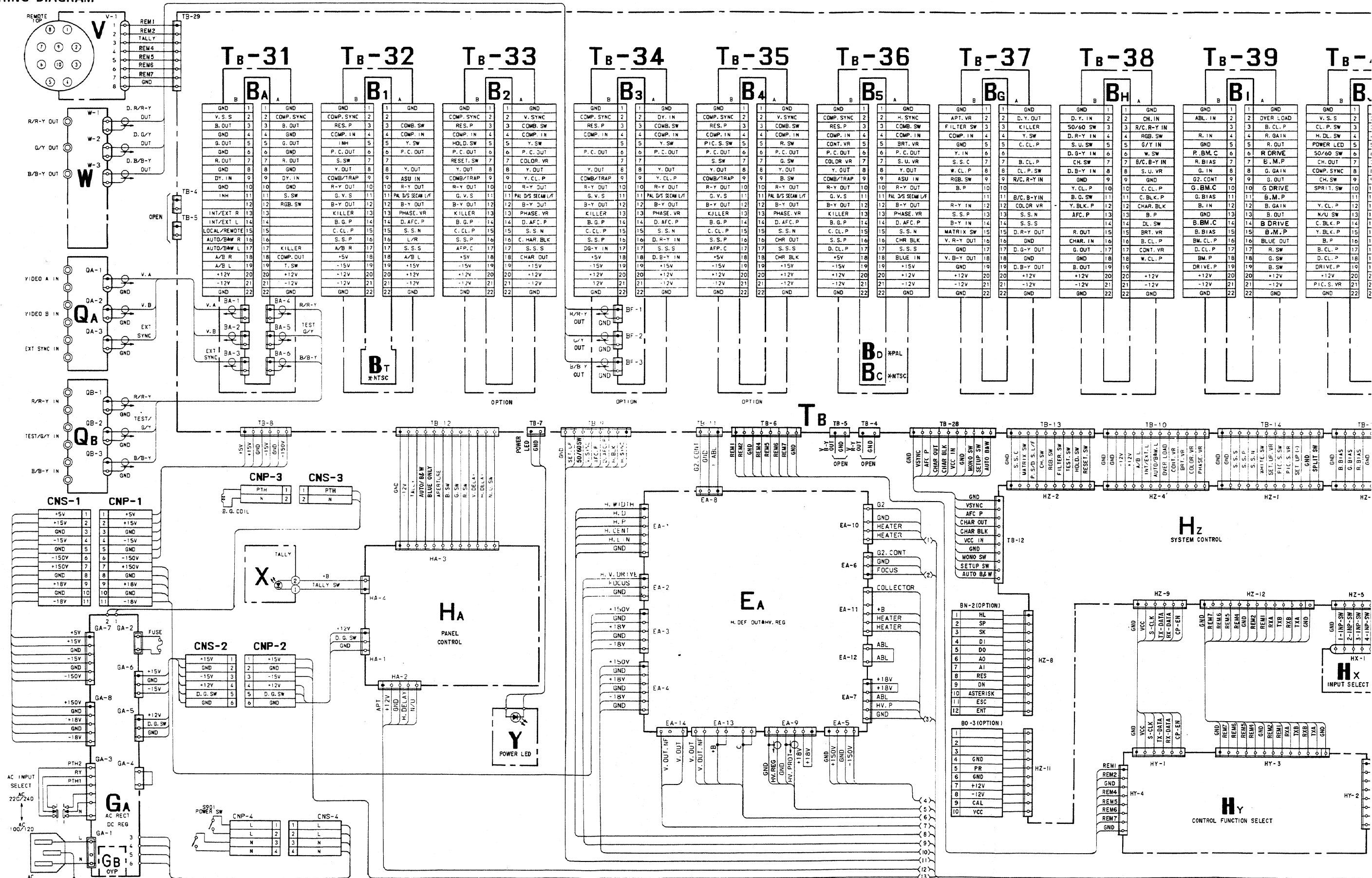
5-1

5-2

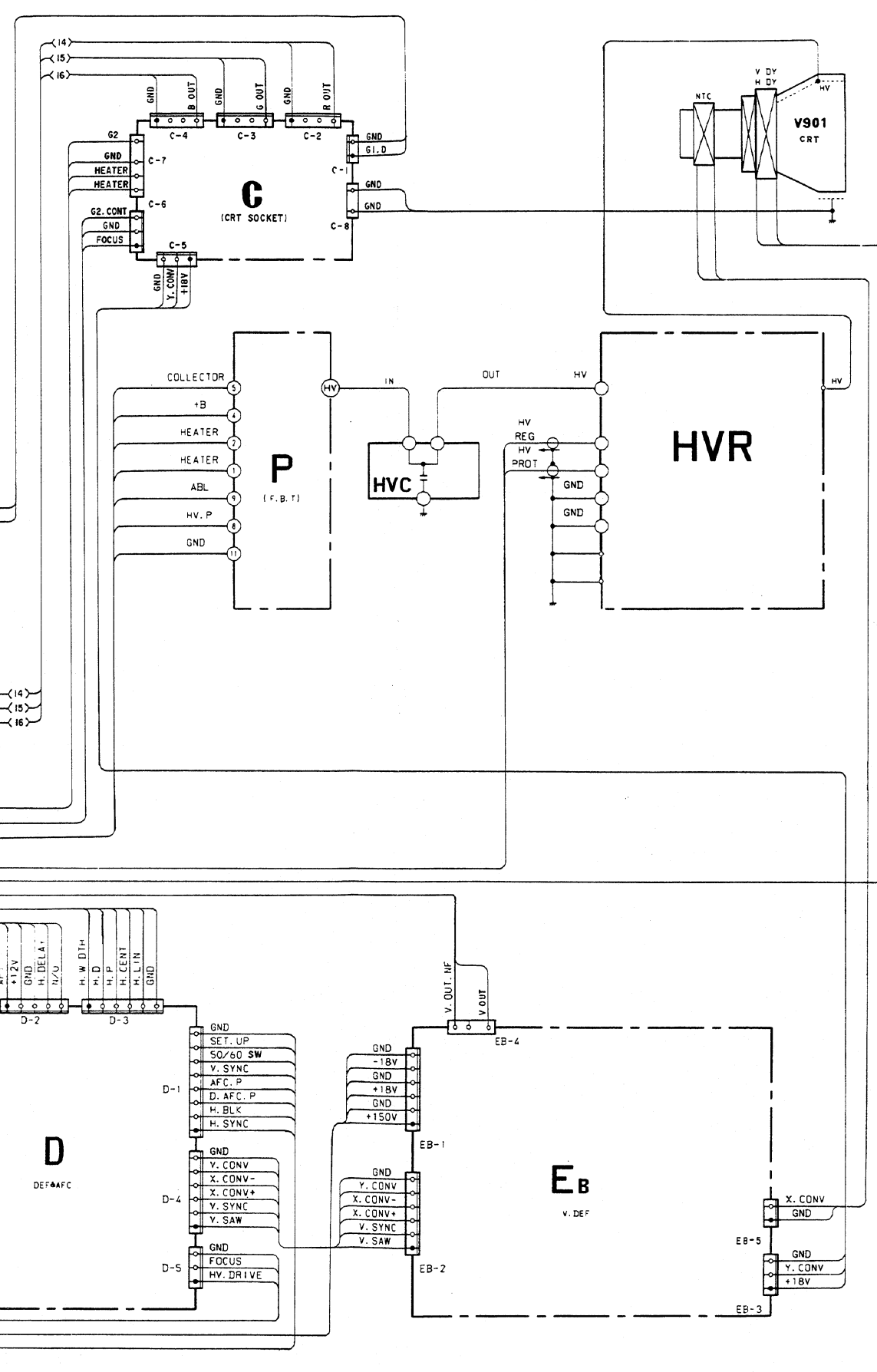
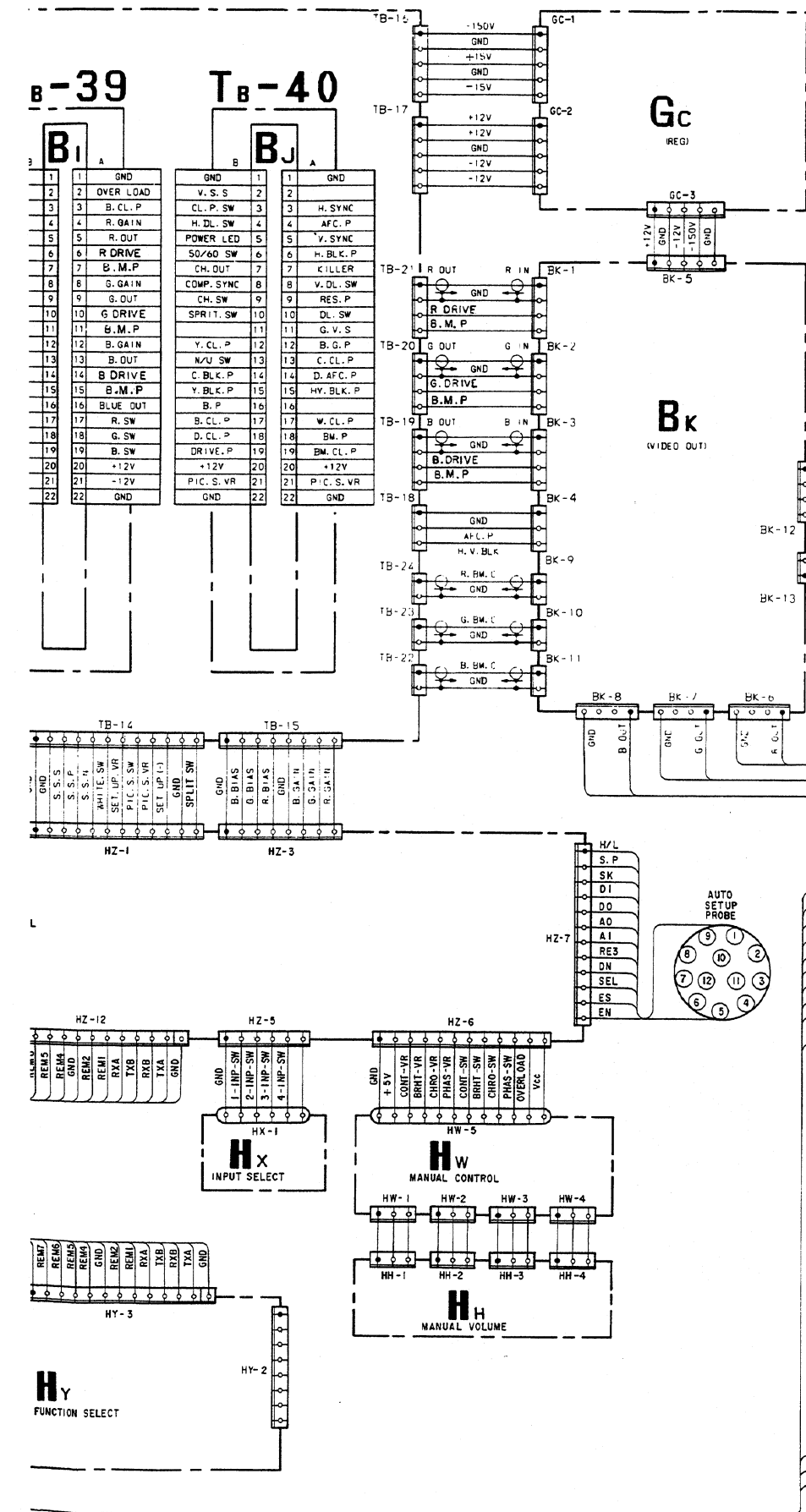


# FRAME FRAME

5-2. FRAME WIRING DIAGRAM





# FRAME FRAME











5-3. MOUNTING AND SCHEMATIC DIAGRAMS

Note:

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et par une marque  sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. p :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, 1/10W on the BT, HY and HZ boards and 1/4W on the rest of the boards unless otherwise specified.  
 $k\Omega = 1000\Omega$ ,  $M\Omega = 1000k\Omega$
-  : nonflammable resistor.
-  : internal component.
-  : direct connection to points marked  on the chassis
-  : panel designation.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- METAL FILM (:RN) resistors in 1%, 1/4W unless otherwise specified.
- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

When replacing components identified by , make the necessary adjustments indicated. If results do not meet the specified value, change the component identified by  and repeat the adjustment until the specified value is achieved.



Refer to R52, R53, R67, R68, R72, R75, R106, R108 and R115.




Adjust on page 4-11 ~ 4-16.

- When replacing the part in below table, be sure to perform the related adjustment.

Reference information

RESISTOR	: RN	METAL FILM
	: RC	SOLID
	: FPRD	NONFLAMMABLE CARBON
	: FUSE	NONFLAMMABLE FUSIBLE
	: RS	NONFLAMMABLE WIREWOUND
COIL	: RB	NONFLAMMABLE CEMENT
	: LF-8L	MICRO INDUCTOR
CAPACITOR	: TA	TANTALUM
	: PS	STYROL
	: PP	POLYPROPYLENE
	: PT	MYLAR
	: MPS	METALIZED POLYESTER
	: MPP	METALIZED POLYPROPYLENE
	: ALB	BIPOLAR
	: ALT	HIGH TEMPERATURE
	: AIR	HIGH RIPPLE

Part replaced (  )	Adjustment (  )
IC3, C59, R67, R68, R78, RV2... (GA board)	+B MAX (R67, R68) Page 4-11.
Q13, Q14, R52, R53 (GA board) Q3, Q4, Q5, D5, D6, D7, D8, R4, R5, R19, R20, R21, R22... (GB board)	+B PROTECTOR (R52, R53) Page 4-11.
IC2, IC3, R61, R62, R71, R72, R73, R74, R75, R88, RV1 (EA board) HVR	HV REG (R72, R75) Page 4-15
IC4, D24, D25, D27, D29, R89, R90, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111 (EA board) HVR	HV HOLD DOWN (R106, R108) Page 4-14
IC4, D24, D26, D27, D29, R89, R90, R102, R103, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124 (EA board) FBT (P board)	BEAM CURRENT PROTECTOR (R115) Page 4-16




-  : adjustment for repair.
-  : B+ bus.
-  : B- bus.
- Circled numbers are waveform references.
- Waveforms are taken with a color-bar signal input and with a  $75\Omega$  terminator connected to an open terminal.

- Switches and controls are as set as follows unless otherwise noted.

FRONT PANEL (R)

- INPUT selector ..... I HX board
- CONTRAST MANUAL switch ..... PRESET
- BRIGHTNESS MANUAL switch ..... PRESET
- CHROMA MANUAL switch ..... PRESET HW board
- PHASE MANUAL switch ..... PRESET



FRONT PANEL (L)

- SCAN MODE switch
-  UNDER SCAN ..... NOR
-  H. DELAY ..... NOR
-  V. DELAY ..... NOR
- SCREEN switch (R) ..... NOR
- SCREEN switch (G) ..... NOR HA board
- SCREEN switch (B) ..... NOR
- APT switch ..... NOR
- BLUE ONLY switch ..... NOR
- MODE selector ..... AUTO

SUB CONTROL PANEL

- FORMAT button ..... CODED
- INPUT button ..... A
- SYNC button ..... INT
- COLOR SYSTEM button ..... NTSC (BVM-1316)  
PAL (BVM-1416P)
- YC SEP button ..... COMB (BVM-1316)  
TRAP (BVM-1416P)
- WHITE BALANCE button ..... D65/D93
- ASPECT button ..... 4 : 3
- PIC SETUP button ..... OFF HY board
- SAD/VITC/MARKER button ..... OFF
- FILTER button ..... OFF
- MATRIX button ..... OFF
- PAL S/SECAM F/COMB S button ..... OFF
- CROSS HATCH button ..... OFF
- SPLIT SCREEN button ..... OFF
- WHITE button ..... OFF
- GRAY button ..... OFF
- AFC switch ..... 2m sec D board

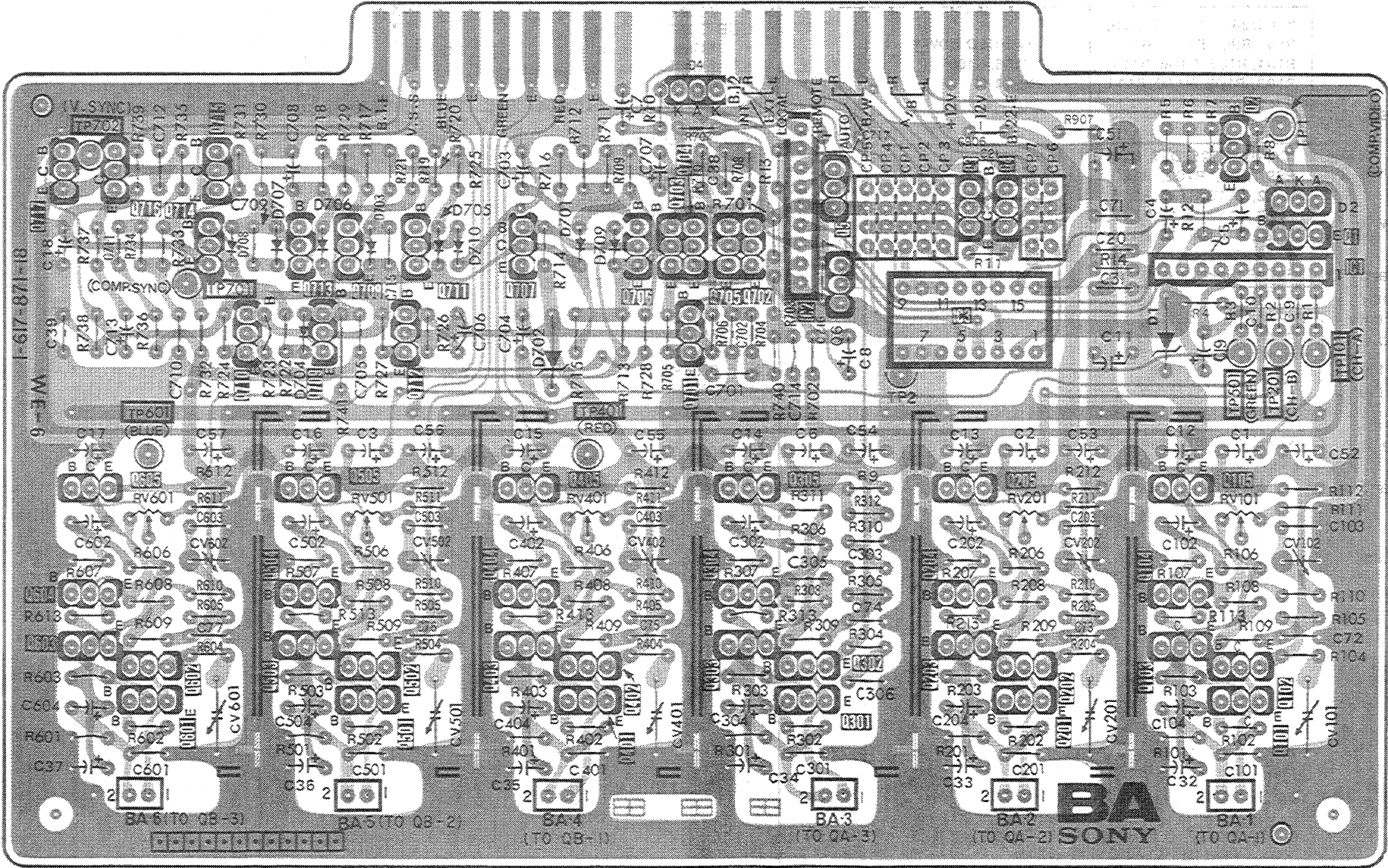
Note:

-  : Pattern from the side which enables seeing.
-  : Pattern of the rear side.



BA board (SYNC SELECT & SYNC SEP, HOOK UP)

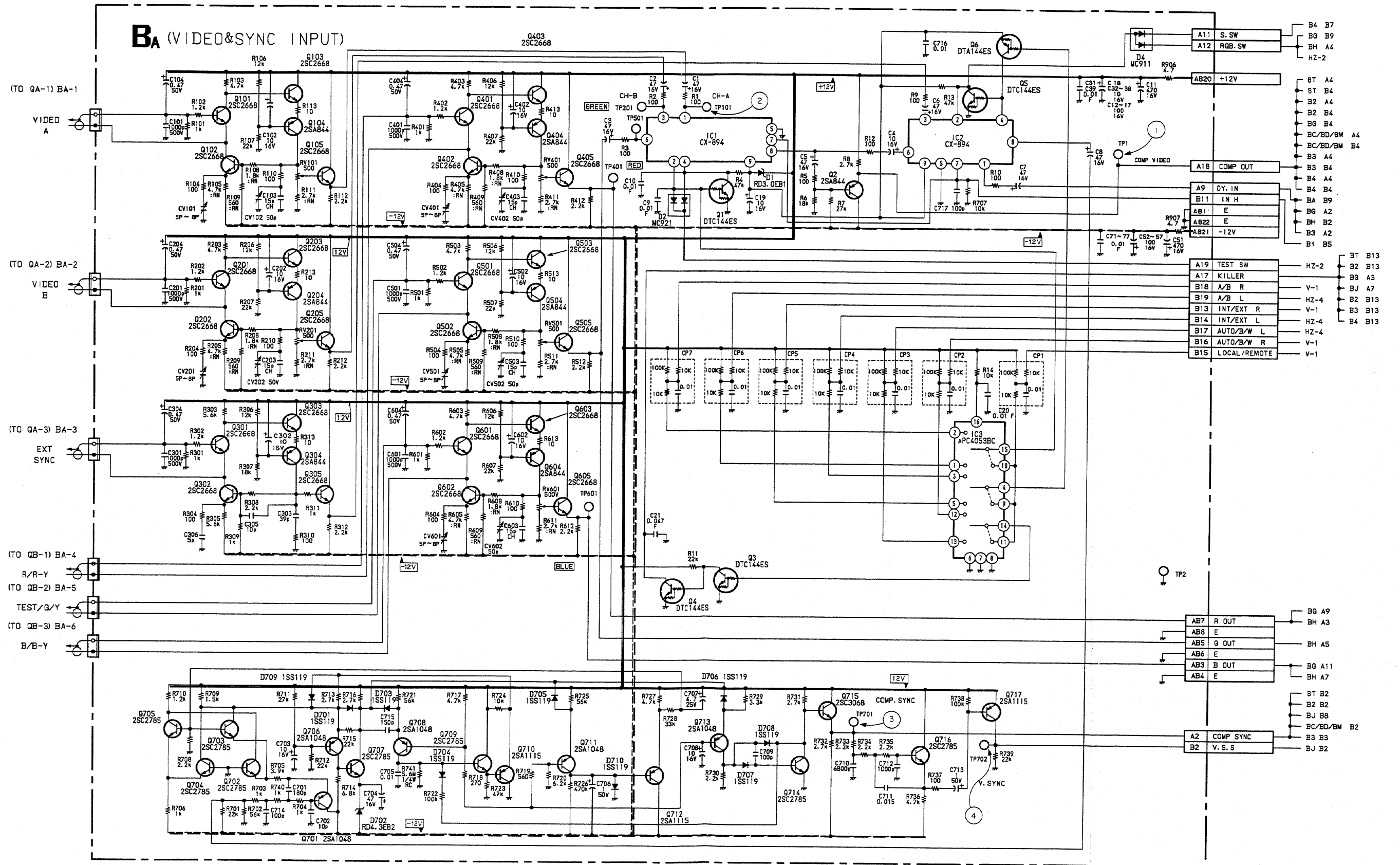
IC													2	3				1																
Q	717	716	715	714	713	708	711	707	706	704	703	705	702	5	6	3	4	2	1															
	605	604	603	602	601	505	504	503	502	501	405	404	403	402	401	305	304	303	302	301	205	204	203	202	201	105	104	103	102	101				
D	708 707 706 704 703 705 710												101	709	4													2						
TP ADJ	TP702	TP601	RV601	CV602	CV601	TP701	RV501	CV502	CV501	TR401	RV401	CV402	CV401	TP2												RV201	CV202	CV201	TP501	RV101	TP201	TP101	CV102	CV101



- Pattern from the side which enables seeing.
- Pattern of the rear side.



BA board (SYNC SELECT & SYNC SEP, HOOK UP)



1	Q1
2	Q2
3	Q3
4	Q4
5	Q5
6	Q6
7	Q7
8	Q8
9	Q9
10	Q10
11	Q11
12	Q12
13	Q13
14	Q14
15	Q15
16	Q16
17	Q17
18	Q18
19	Q19
20	Q20
21	Q21
22	Q22
23	Q23
24	Q24
25	Q25
26	Q26
27	Q27
28	Q28
29	Q29
30	Q30
31	Q31
32	Q32
33	Q33
34	Q34
35	Q35
36	Q36
37	Q37
38	Q38
39	Q39
40	Q40
41	Q41
42	Q42
43	Q43
44	Q44
45	Q45
46	Q46
47	Q47
48	Q48
49	Q49
50	Q50
51	Q51
52	Q52
53	Q53
54	Q54
55	Q55
56	Q56
57	Q57
58	Q58
59	Q59
60	Q60
61	Q61
62	Q62
63	Q63
64	Q64
65	Q65
66	Q66
67	Q67
68	Q68
69	Q69
70	Q70
71	Q71
72	Q72
73	Q73
74	Q74
75	Q75
76	Q76
77	Q77
78	Q78
79	Q79
80	Q80
81	Q81
82	Q82
83	Q83
84	Q84
85	Q85
86	Q86
87	Q87
88	Q88
89	Q89
90	Q90
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92	Q92
93	Q93
94	Q94
95	Q95
96	Q96
97	Q97
98	Q98
99	Q99
100	Q100

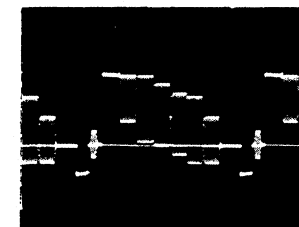
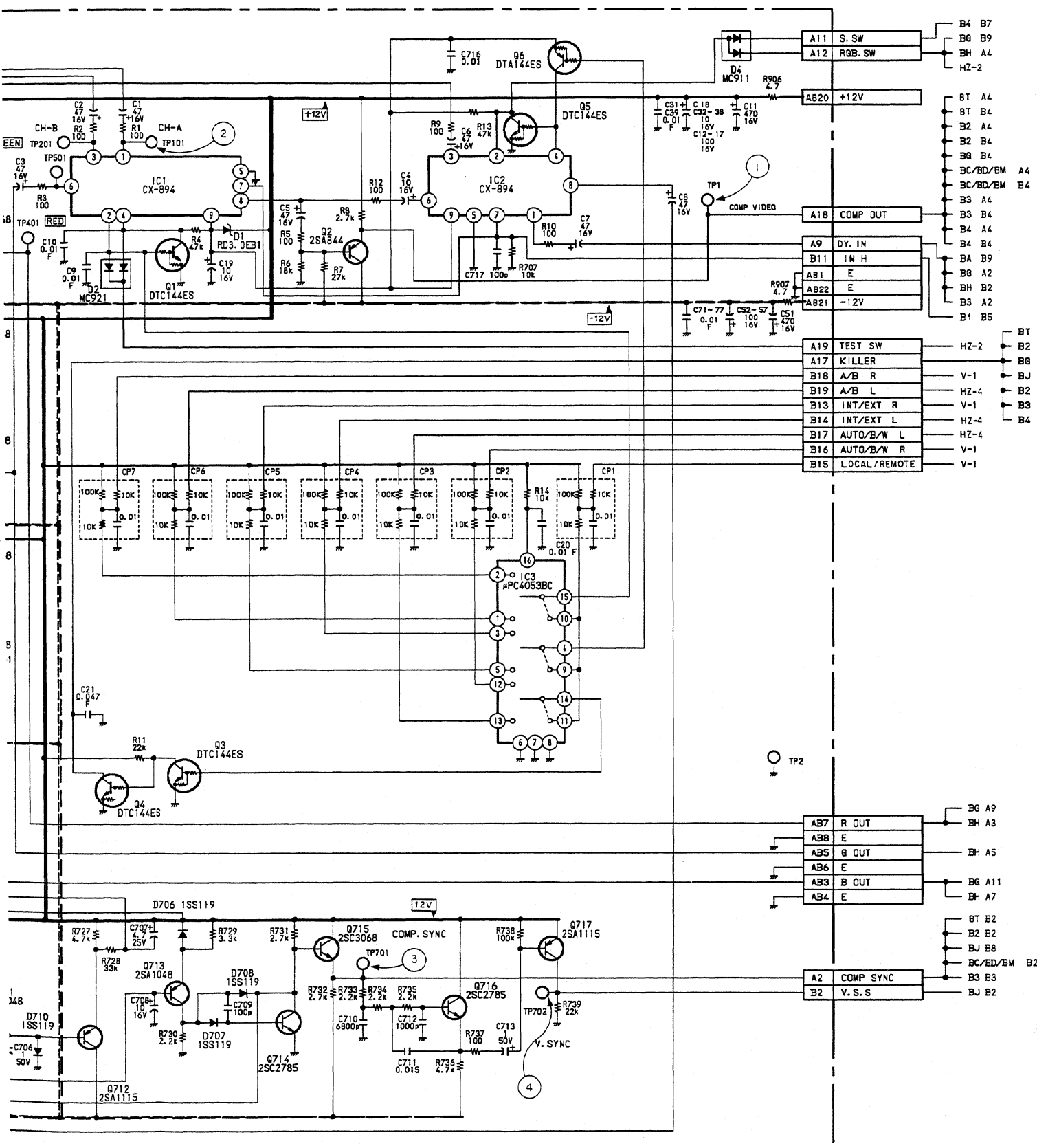
1	Q1
2	Q2
3	Q3
4	Q4
5	Q5
6	Q6
7	Q7
8	Q8
9	Q9
10	Q10
11	Q11
12	Q12
13	Q13
14	Q14
15	Q15
16	Q16
17	Q17
18	Q18
19	Q19
20	Q20
21	Q21
22	Q22
23	Q23
24	Q24
25	Q25
26	Q26
27	Q27
28	Q28
29	Q29
30	Q30
31	Q31
32	Q32
33	Q33
34	Q34
35	Q35
36	Q36
37	Q37
38	Q38
39	Q39
40	Q40
41	Q41
42	Q42
43	Q43
44	Q44
45	Q45
46	Q46
47	Q47
48	Q48
49	Q49
50	Q50
51	Q51
52	Q52
53	Q53
54	Q54
55	Q55
56	Q56
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61	Q61
62	Q62
63	Q63
64	Q64
65	Q65
66	Q66
67	Q67
68	Q68
69	Q69
70	Q70
71	Q71
72	Q72
73	Q73
74	Q74
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76	Q76
77	Q77
78	Q78
79	Q79
80	Q80
81	Q81
82	Q82
83	Q83
84	Q84
85	Q85
86	Q86
87	Q87
88	Q88
89	Q89
90	Q90
91	Q91
92	Q92
93	Q93
94	Q94
95	Q95
96	Q96
97	Q97
98	Q98
99	Q99
100	Q100

BA BOARD

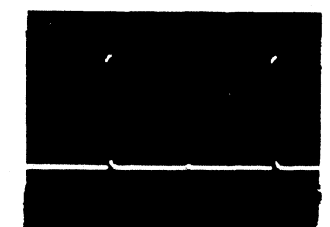
IC1	CX894	INPUT SELECT
2	CX894	SYNC SELECT
3	MC14053BCP	LOCAL/REMOTE SW
Q1	DTC144ES	INPUT SELECT CONTROL
2	2SA844	BUFF
3	DTC144ES	KILLER
4	DTC144ES	KILLER
5	DTC144ES	SYNC SELECT CONTROL
6	DTA144ES	INT/EXT CONTROL
101	2SC2668	VIDEO A AMP
102	2SC2668	VIDEO A AMP
103	2SC2668	VIDEO A AMP
104	2SA844	VIDEO A AMP
105	2SC2668	VIDEO A AMP
201	2SC2668	VIDEO B AMP
202	2SC2668	VIDEO B AMP
203	2SC2668	VIDEO B AMP
204	2SA844	VIDEO B AMP
205	2SC2668	VIDEO B AMP
301	2SC2668	EXT SYNC AMP
302	2SC2668	EXT SYNC AMP
303	2SC2668	EXT SYNC AMP
304	2SA844	EXT SYNC AMP
305	2SC2668	EXT SYNC AMP
401	2SC2668	R-Y/R AMP
402	2SC2668	R-Y/R AMP
403	2SC2668	R-Y/R AMP
404	2SA844	R-Y/R AMP
405	2SC2668	R-Y/R AMP
501	2SC2668	TEST/Y/G AMP
502	2SC2668	TEST/Y/G AMP
503	2SC2668	TEST/Y/G AMP
504	2SA844	TEST/Y/G AMP
505	2SC2668	TEST/Y/G AMP
601	2SC2668	B-Y/B AMP
602	2SC2668	B-Y/B AMP

Q603	2SC2668	B-Y/B AMP
604	2SA844	B-Y/B AMP
605	2SC2668	B-Y/B AMP
701	2SA1048	SYNC AGC
702	2SC2785	SYNC AGC
703	2SC2785	SYNC AGC
704	2SC2785	SYNC AGC
705	2SC2785	SYNC AGC
706	2SA1048	SYNC AGC
707	2SC2785	SYNC AGC
708	2SA1048	SYNC AGC
709	2SC2785	SYNC AGC
710	2SA1115	SYNC AGC
711	2SA1048	SYNC AGC
712	2SA1115	SYNC AGC
713	2SA1048	COMP SYNC SEP
714	2SC2785	COMP SYNC SEP
715	2SC3068	COMP SYNC SEP
716	2SC2785	V SYNC SEP
717	2SA1115	V SYNC SEP
D1	RD3.0E-B1	+9V REG
2	MC921	INPUT SELECT CONTROL
4	MC911	SYNC SELECT CONTROL
701	1SS119	SYNC AGC
702	RD4.3E-B2	-7.5V REG
703	1SS119	SYNC AGC
704	1SS119	SYNC AGC
705	1SS119	SYNC AGC
706	1SS119	SYNC AGC
707	1SS119	COMP SYNC SEP
708	1SS119	COMP SYNC SEP
709	1SS119	SYNC AGC
710	1SS119	SYNC AGC

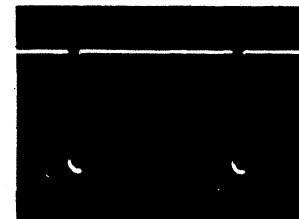
5. DIAGRAMS



① 1Vp-p (H)  
② 1Vp-p (H)



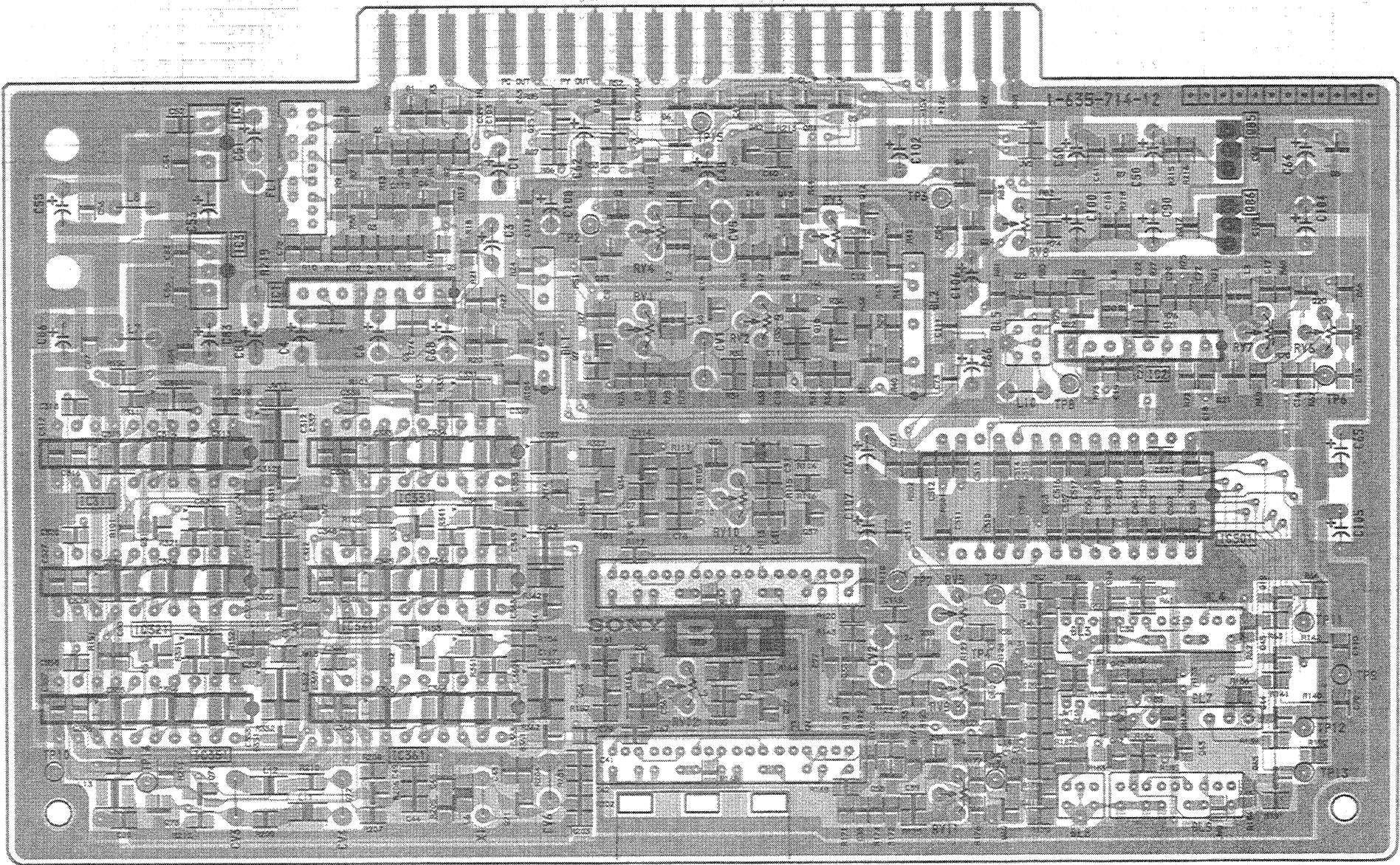
④ 12Vp-p (V)



③ 12Vp-p (H)

BT board (3 LINE DYNAMIC COMB FILTER, 2 LINE SIMPLE COMB FILTER, BPF) (BVM-1316 ONLY)

IC	311	4	1	331	501	2
	321	3		341		
	351			361		
Q						
D						
ADJ						
TP						



BT BOARD

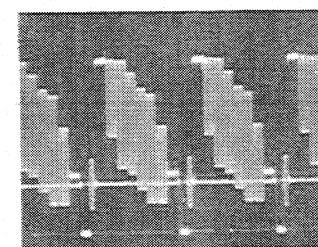
IC1	LA7816	Y SELECT
2	LA7816	C SELECT
3	NJM7809FA	5V REG
4	NJM7805FA	5V REG
331	CXL1009P	CCD
341	CXL1009P	CCD
361	CXL1009P	CCD
501	CXA1539P	CORRELATION
Q1	2SA812	BUFFER
2	2SC1623	BUFFER
31	2SA1226	AMP
4	2SC2757	AMP
5	2SC1623	AMP
6	2SC1623	Y DELAY
7	2SA1226	Y DELAY
8	2SA812	Y DELAY
9	2SA1226	Y/C MIX
10	2SC2757	Y/C MIX
11	2SC1623	Y AMP & BUFF
12	2SA1226	Y AMP & BUFF
13	2SC2757	Y AMP & BUFF
14	2SC2757	Y DELAY
15	2SA812	Y DELAY
16	2SC3624A	BUFFER & SW
17	2SC1623	BPF 140 nsec
18	2SA812	BPF 140 nsec
19	2SC1623	BPF 140 nsec
20	2SC2757	S COMB C LEV
21	2SC1623	S COMB C LEV
22	2SC1623	BPF, BUFFER
23	2SC1623	BPF, BUFFER
24	2SA812	BPF, BUFFER
25	2SC3624A	BUFFER & SW
32	2SC1623	1H DELAY(NTS)
33	2SC1623	1H DELAY(NTS)
34	2SA812	1H DELAY(NTS)
35	2SA812	1H DELAY(NTS)
36	2SA1226	1H DELAY(NTS)
37	2SC1623	AMP
38	2SA1226	AMP
39	2SC2757	AMP
40	2SC1623	AMP
41	2SC1623	BPF 140 ns 0
42	2SA812	BPF 140 ns 0
43	2SC1623	BPF 140 ns 0
44	2SC1623	BPF 140 ns 0
45	2SC1623	BPF 140 ns 0
52	2SC1623	1H DELAY(NTS)
54	2SA812	1H DELAY(NTS)
56	2SA1226	1H DELAY(NTS)
57	2SC1623	AMP
58	2SA1226	AMP
59	2SC2757	AMP

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

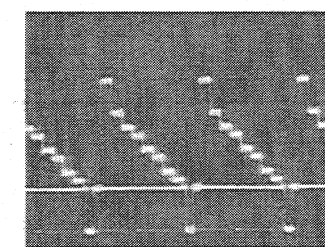


## BT BOARD

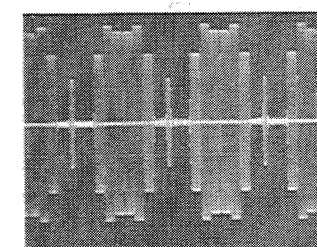
IC1	LA7816	Y SELECT	Q60	ZSC1623	AMP
2	LA7816	C SELECT	61	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)
3	NJM7805FA	SV REG	62	ZSA812	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)
4	NJM7805FA	SV REG	65	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)
331	CXL1009P	CCD	71	ZSC2757	X'TAL OSC
341	CXL1009P	CCD	72	ZSA1226	X'TAL OSC
361	CXL1009P	CCD	73	ZSC2757	X'TAL OSC
501	CXA1539P	CORRELATION	74	ZSA1226	X'TAL OSC
Q1	ZSA812	BUFFER	81	DTA144EK	SW CONTROL
2	ZSC1623	BUFFER	82	DTA144EK	SW CONTROL
3	ZSA1226	AMP	83	DTA144EK	SW CONTROL
4	ZSC2757	AMP	84	DTA144EK	SW CONTROL
5	ZSC1623	AMP	85	ZSB734	SW CONTROL
6	ZSC1623	Y DELAY	86	ZSD774	SW CONTROL
7	ZSA1226	Y DELAY	D1	1S2835	SW
8	ZSA812	Y DELAY	2	RD5.6M82	DC/SHIFT
9	ZSA1226	Y/C MIX	3	1S2837	SW
10	ZSC2757	Y/C MIX	4	1S2837	SW
11	ZSC1623	Y AMP & BUFFER	5	1S2837	SW CONTROL
12	ZSA1226	Y AMP & BUFFER	6	1S2835	SW CONTROL
13	ZSC2757	Y AMP & BUFFER	7	1S2837	SW CONTROL
14	ZSC2757	Y DELAY	8	1S2835	SW CONTROL
15	ZSA812	Y DELAY	9	1S2835	SW CONTROL
16	ZSC3624A	BUFFER & SW	331	1S2837	CLAMP
17	ZSC1623	BPF 140 nsec(NTSC)110 nsec(PAL)	341	1S2837	CLAMP
18	ZSA812	BPF 140 nsec(NTSC)110 nsec(PAL)	361	1S2837	CLAMP
19	ZSC1623	BPF 140 nsec(NTSC)110 nsec(PAL)			
20	ZSC2757	S COMB C LEVEL PHASE			
21	ZSC1623	S COMB C LEVEL PHASE			
22	ZSC1623	BPF BUFFER			
23	ZSC1623	BPF BUFFER			
24	ZSA812	BPF BUFFER			
25	ZSC3624A	BUFFER & SW			
32	ZSC1623	1H DELAY(NTSC)2H DELAY(PAL)			
33	ZSC1623	1H DELAY(NTSC)2H DELAY(PAL)			
34	ZSA812	1H DELAY(NTSC)2H DELAY(PAL)			
35	ZSA812	1H DELAY(NTSC)2H DELAY(PAL)			
36	ZSA1226	1H DELAY(NTSC)2H DELAY(PAL)			
37	ZSC1623	AMP			
38	ZSA1226	AMP			
39	ZSC2757	AMP			
40	ZSC1623	AMP			
41	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)			
42	ZSA812	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)			
43	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)			
44	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)			
45	ZSC1623	BPF 140 ns DELAY(NTSC)110 ns DELAY(PAL)			
52	ZSC1623	1H DELAY(NTSC)2H DELAY(PAL)			
54	ZSA812	1H DELAY(NTSC)2H DELAY(PAL)			
56	ZSA1226	1H DELAY(NTSC)2H DELAY(PAL)			
57	ZSC1623	AMP			
58	ZSA1226	AMP			
59	ZSC2757	AMP			



① 1.1 Vp-p(H)



② 0.95 Vp-p(H)

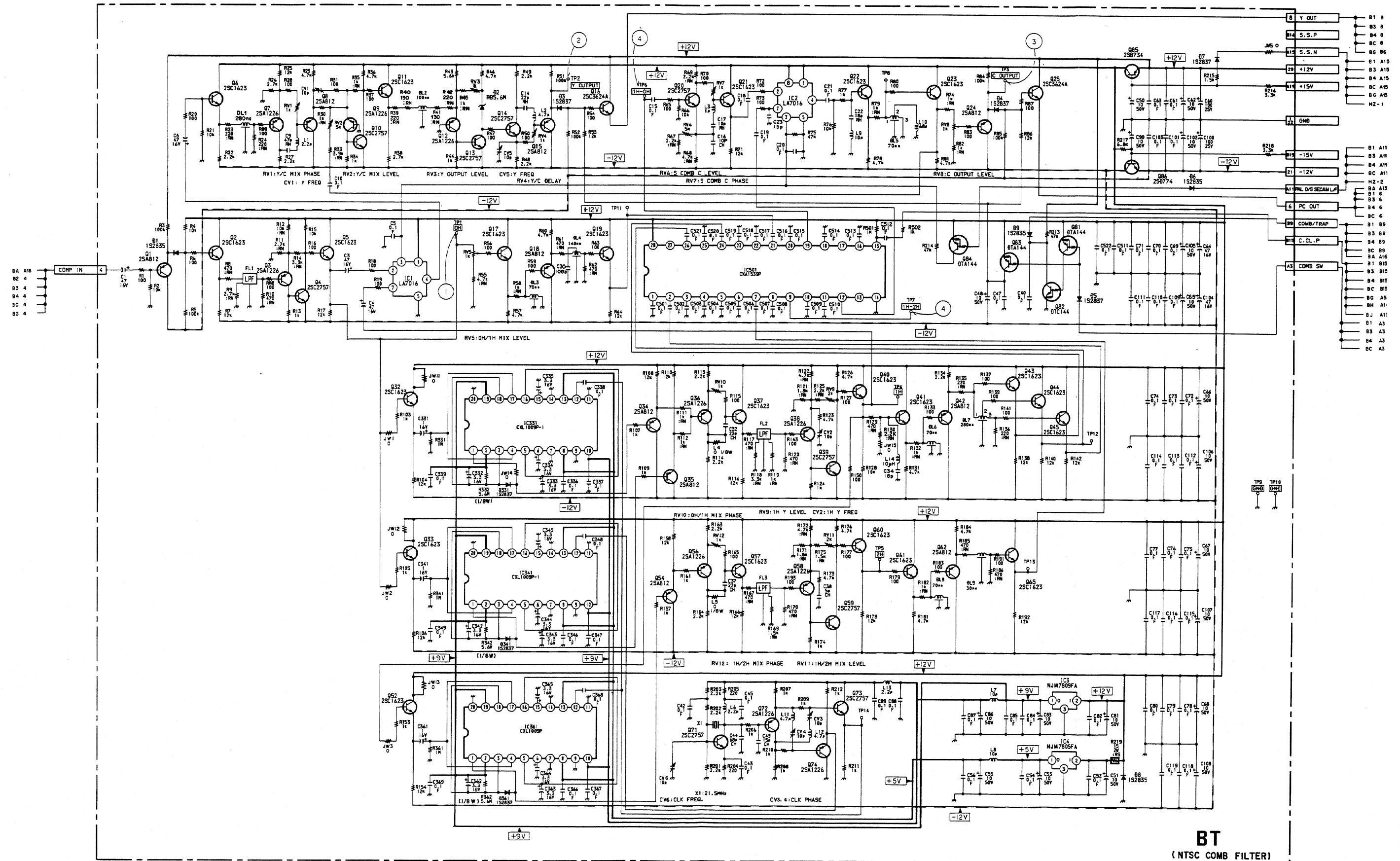


③ 0.58 Vp-p(H)

④ 1.9 Vp-p(H)

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

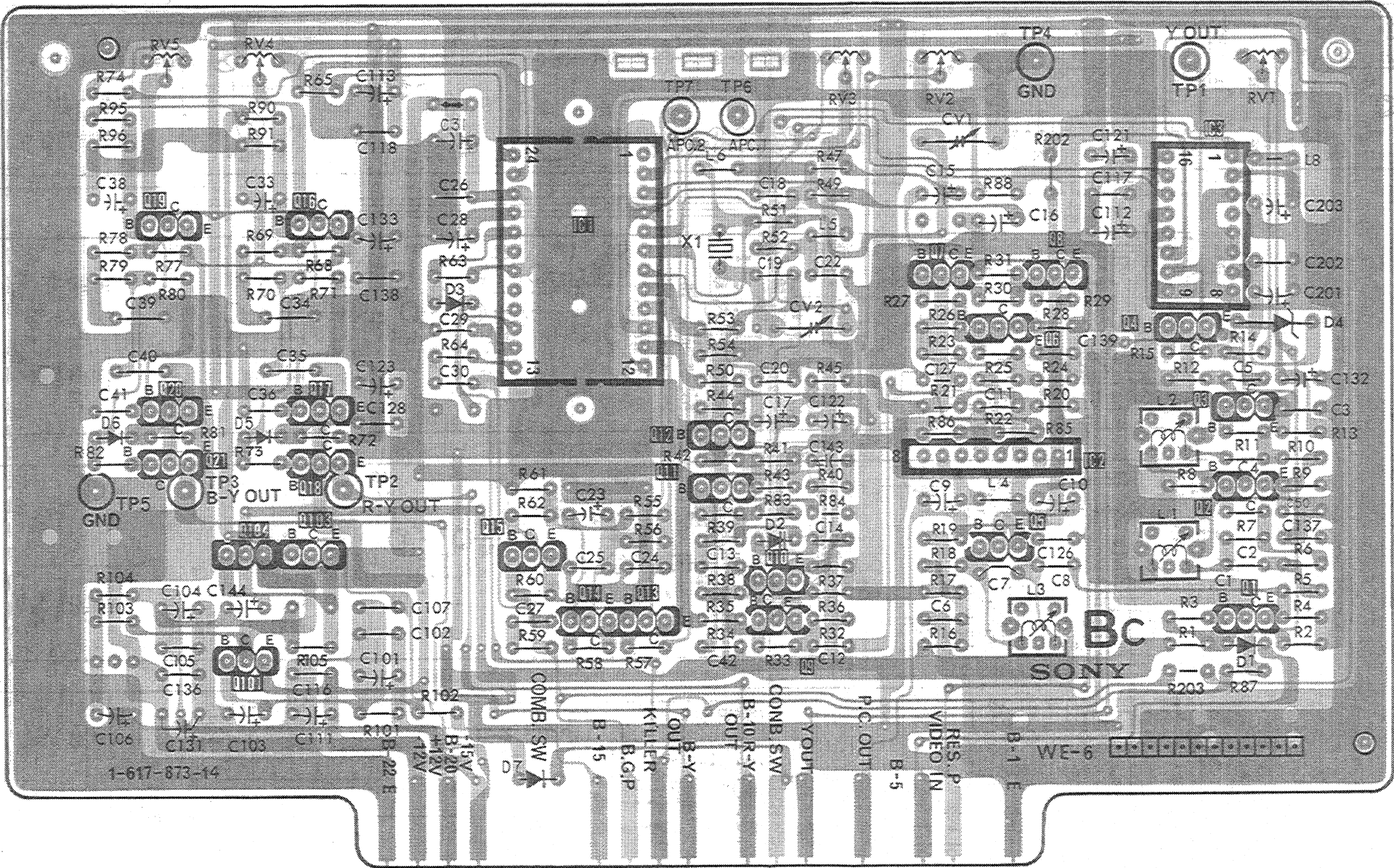
BT board (3 LINE DYNAMIC COMB FILTER, 2 LINE SIMPLE COMB FILTER, BPF) (BVM-1316 ONLY)





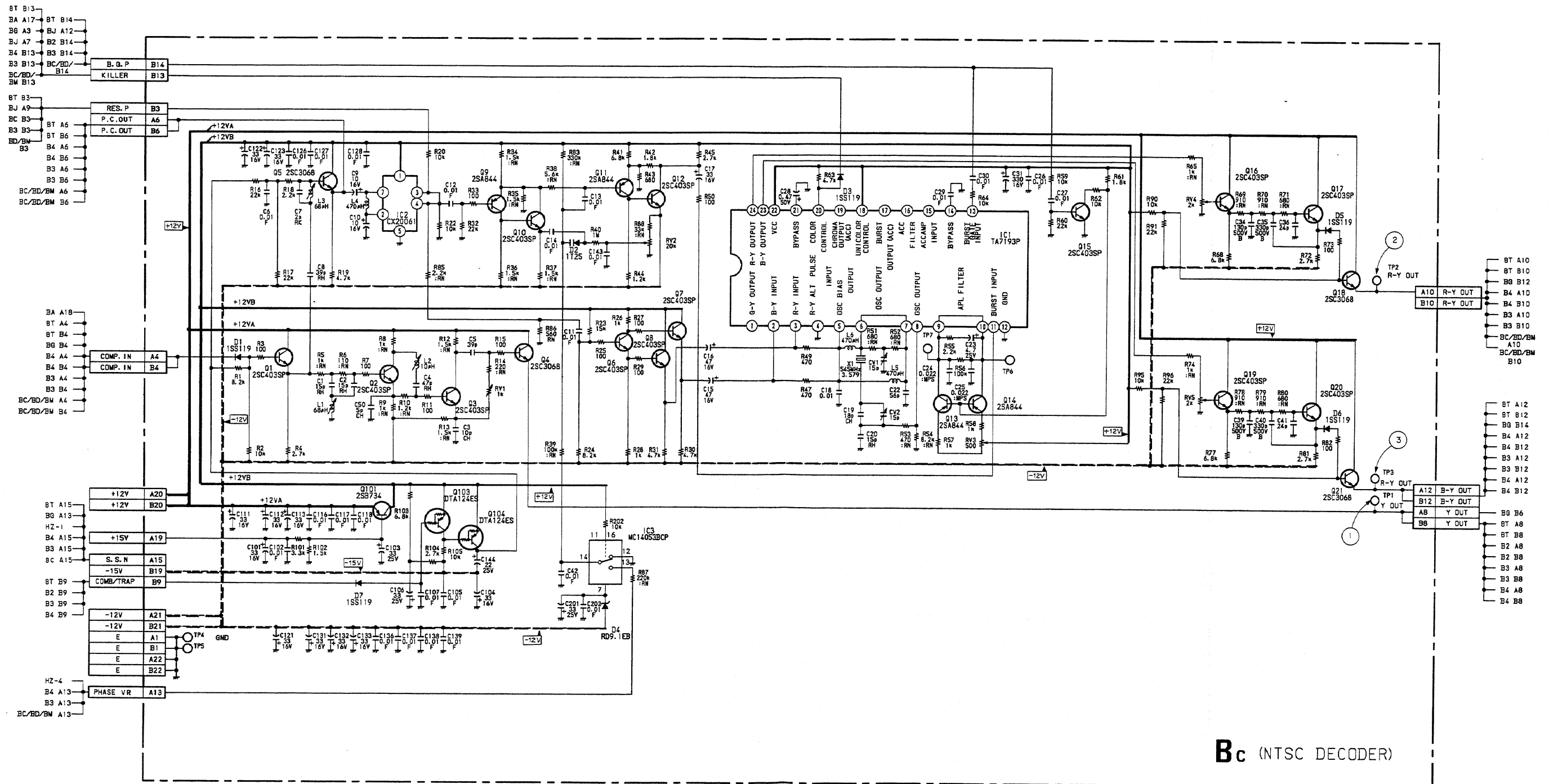
BC Board (NTSC DECODER Y TRAP) (BVM-1316 ONLY)

IC	1										2	3			
Q	19 20 21		16 17 18		15		14		13		12 11	7	6	8	4
D	104 101		103	3		7		2		9		5		3 2 1	
TP	RV5		RV4	TP7		TP6	RV3		RV2	TP4		TP1		RV1	
ADJ	TP5	TP3	TP2		CV2		CV1								



- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

BC Board (NTSC DECODER Y. TRAP)  
(BVM-1316 ONLY)



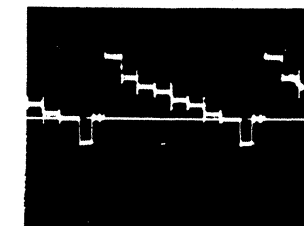
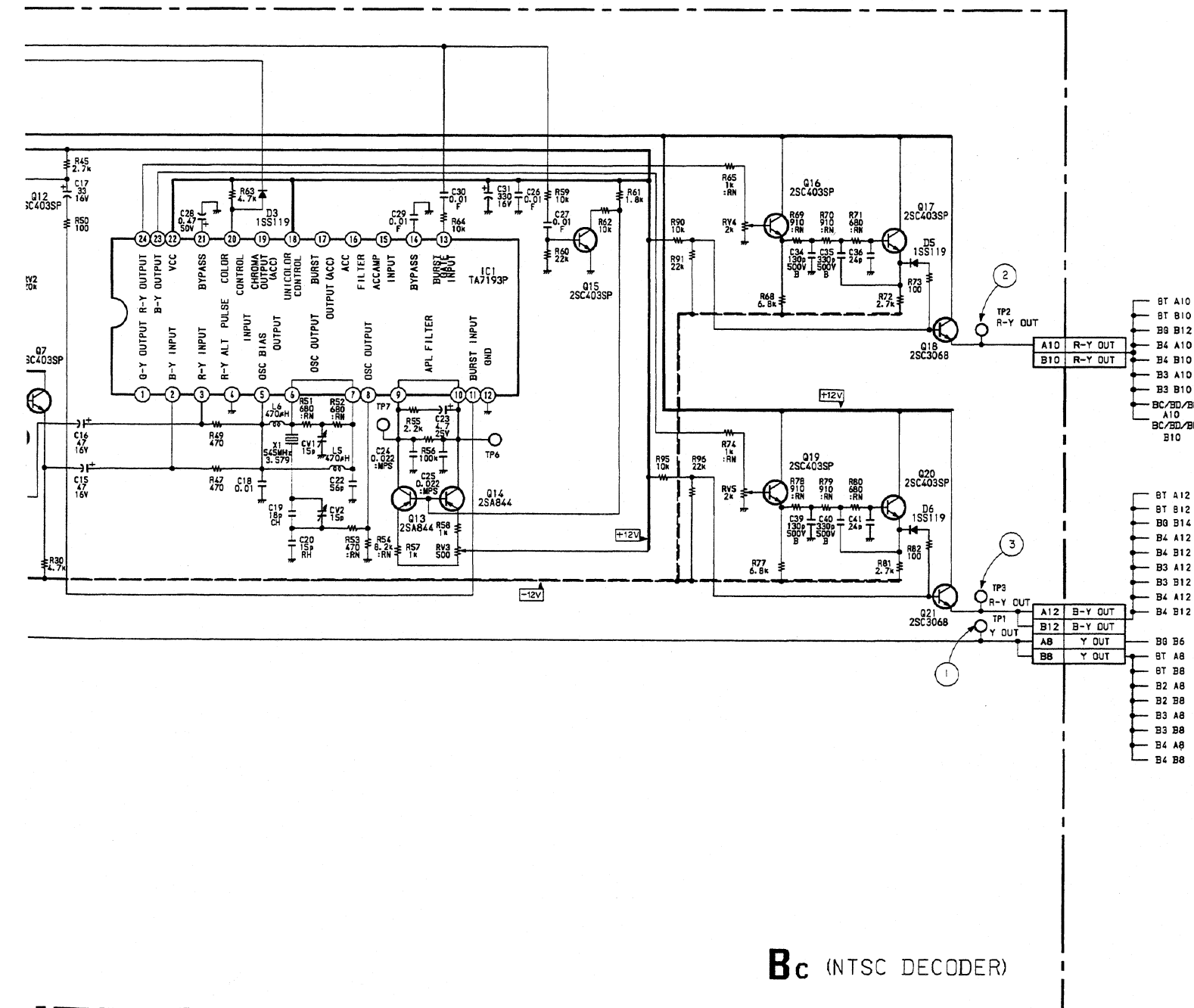
Bc (NTSC DECODER)

BC BOARD

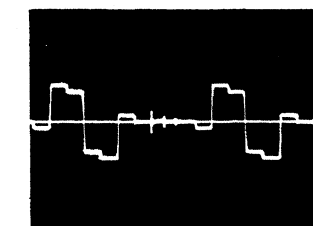
IC1	TA7193P	DEMODULATOR
2	CX20061	RESIDUAL SWITCH
3	MC14053BCP	ANALOG SWITCH
Q1	2SC403SP	BUFF.
2	2SC403SP	ACTIVE FILTER
3	2SC403SP	Y-DELAY CORRECT
4	2SC3068	BUFF.
5	2SC3068	BUFF.
6	2SC403SP	AMP.
7	2SC403SP	BUFF.
8	2SC403SP	BUFF.
9	2SA844	PHASE CONTROL
10	2SC403SP	PHASE CONTROL
11	2SA844	PHASE CONTROL
12	2SC403SP	PHASE CONTROL
13	2SA844	APL FILTER

14	2SA844	APL FILTER
15	2SC403SP	APL FILTER
16	2SC403SP	LOW PASS FILTER
17	2SC403SP	LOW PASS FILTER
18	2SC3068	BUFF.
19	2SC403SP	LOW PASS FILTER
20	2SC403SP	LOW PASS FILTER
21	2SC3068	BUFF.
101	2SB734	SYSTEM SW.
103	DTA124ES	COMB. SWITCH
104	DTA124ES	COMB. SWITCH
D1	1SS119	SYSTEM SWITCH
2	1T25	PHASE CONTROL
3	1SS119	KILLER SWITCH
4	RD9.1EB3	SWITCH BIAS.
5	1SS119	SYSTEM SWITCH
6	1SS119	SYSTEM SWITCH
7	1SS119	PROTECTOR

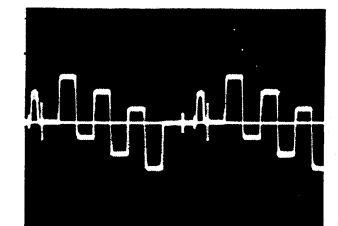
5. DIAGRAMS



① 1Vp-p (H)



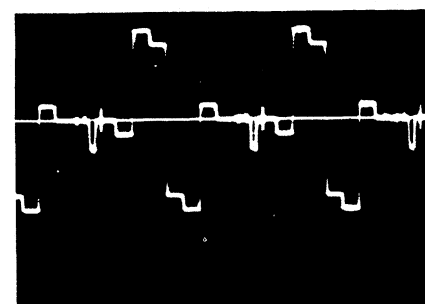
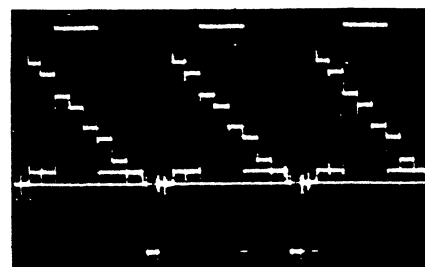
② 0.3Vp-p (H)



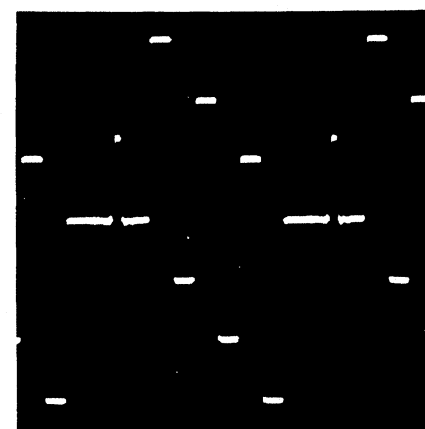
③ 0.36 Vp-p (H)



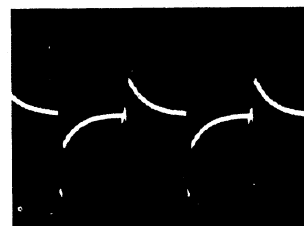
## BD board (PAL DECODER Y.TRAP) (BVM-1416P ONLY)



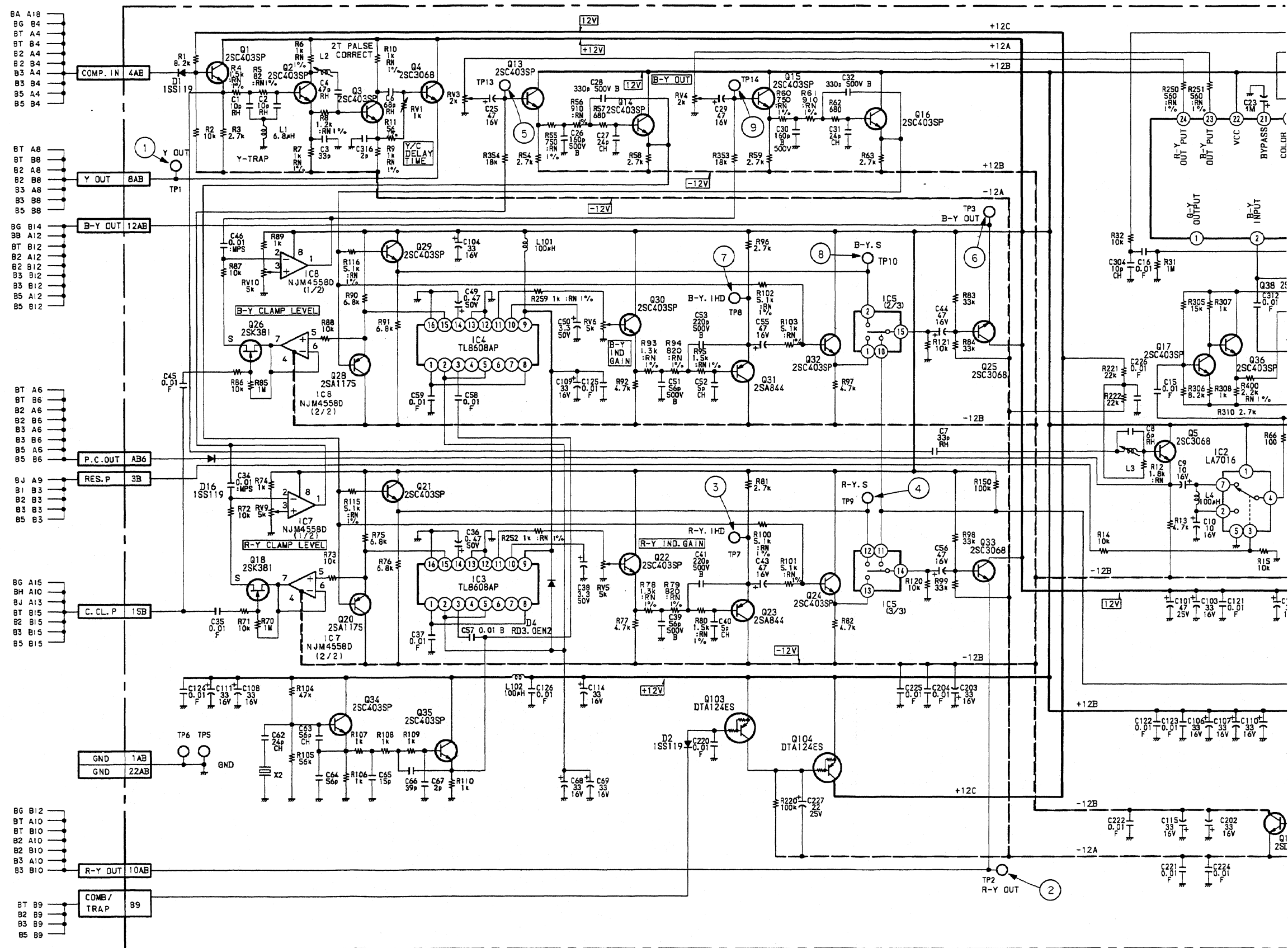
- 3 0.32Vp-p      4 0.32Vp-p  
5 0.36Vp-p



- 7 0.38Vp-p      8 0.39Vp-p  
9 0.42Vp-p



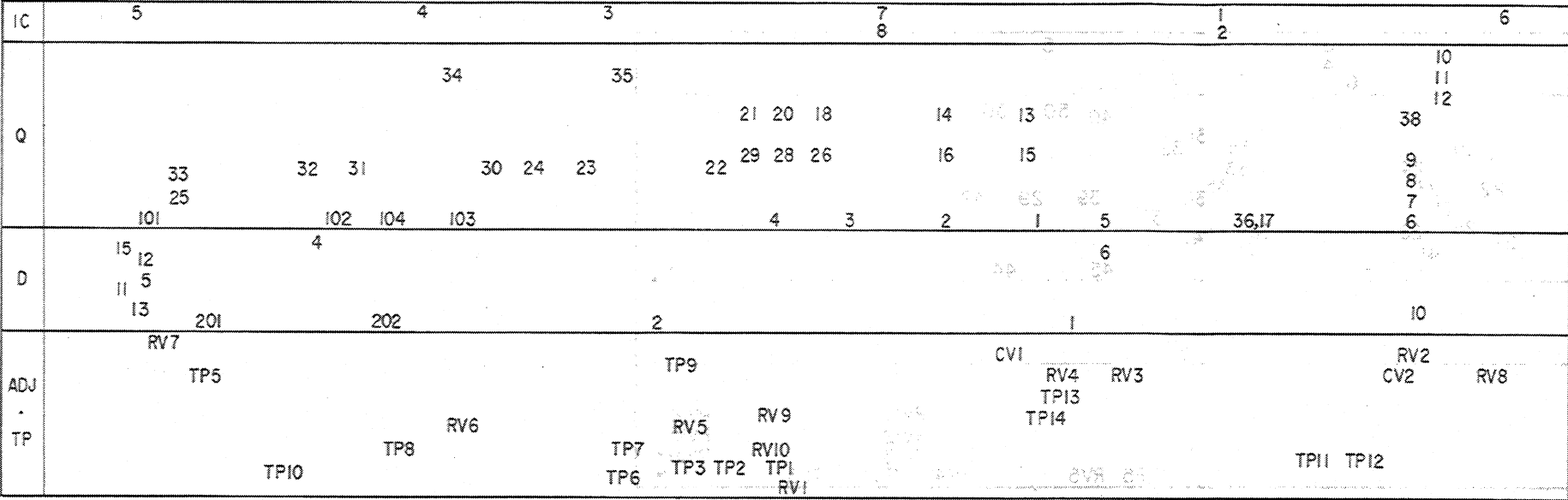
- 11 0.26Vp-p (H)



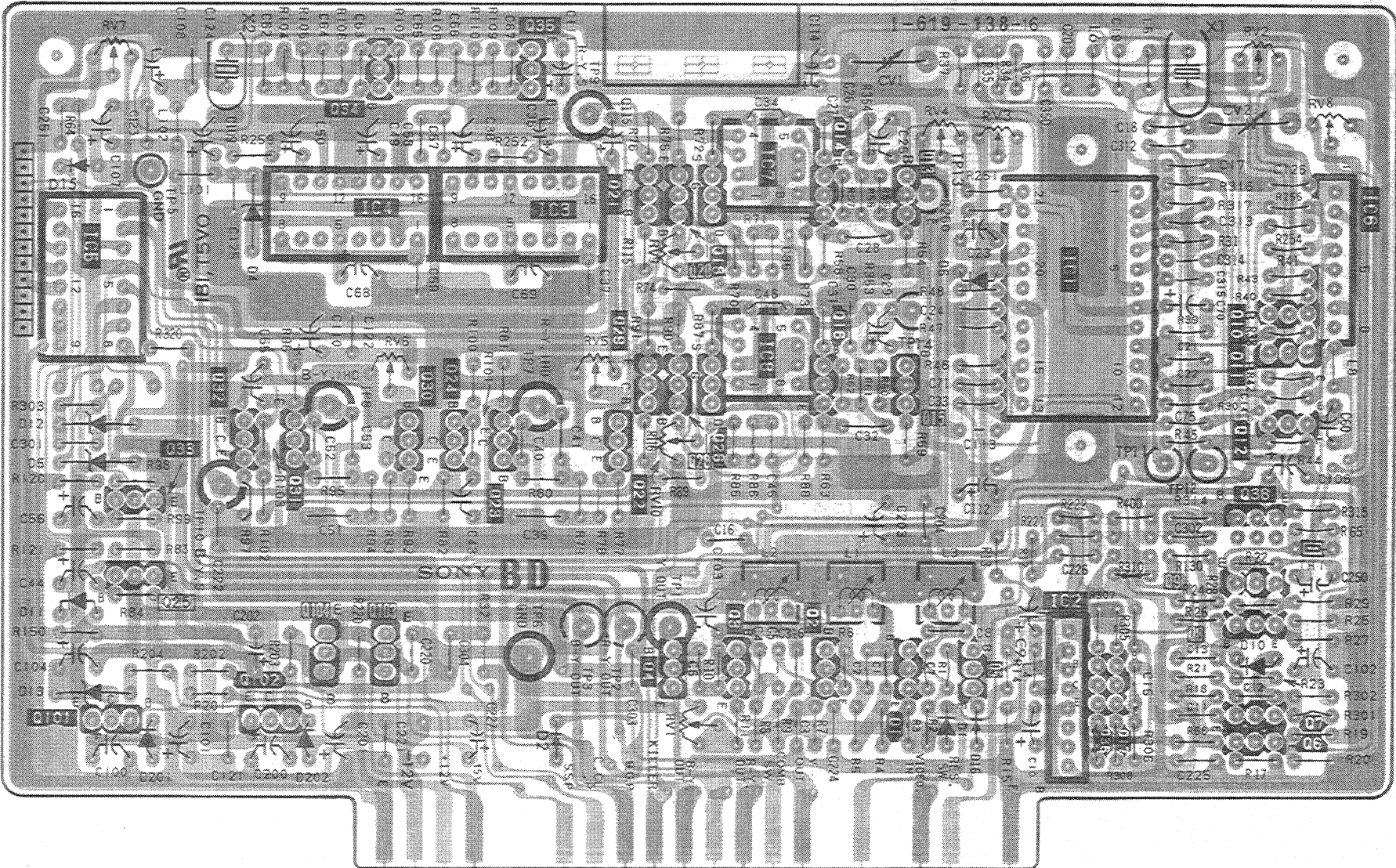
BD BD



BD board (PAL DECODER Y. TRAP) (BVM-1416P ONLY)



IC1	TA7193P	PAL DEMODULATOR
2	LA7016	RESIDUAL SWITCH
3	TL8608P	1H DELAY LINE
4	TL8608P	1H DELAY LINE
5	MC14053BCP	ANALOG SWITCHER
6	LA7016	BURST GATE
7	NJM4558P	R-Y CLAMP
8	NJM4558P	B-Y CLAMP
Q1	2SC403SP	BUFFER
2	2SC403SP	ACTIVE FILTER
3	2SC403SP	Y-DELAY CORRECTOR
4	2SC3068	BUFFER
5	2SC3068	BUFFER
6	2SA844	PHASE CONTROLLER
7	2SC403SP	PHASE CONTROLLER
8	NJM4558P	PHASE CONT. AMP.
9	NJM4558P	PHASE CONT. AMP.
10	2SA1175	APL FILTER
11	2SA1175	APL FILTER
12	2SC403SP	APL FILTER SWITCH
13	2SC403SP	R-Y L.P.F
14	2SC403SP	R-Y L.P.F
15	2SC403SP	B-Y L.P.F
16	2SC403SP	B-Y L.P.F
17	2SC403SP	AMPLIFIER
18	2SK381	R-Y CLAMP
20	2SA1175	BUFFER
21	2SC403SP	BUFFER
22	2SC403SP	CCD OUT L.P.F
23	2SA844	CCD OUT L.P.F
24	2SC403SP	BUFFER
25	2SC3068	BUFFER
26	2SK381	B-Y CLAMP
28	2SA1175	BUFFER
29	2SC403SP	BUFFER
30	2SC403SP	CCD OUT L.P.F
31	2SA844	CCD OUT L.P.F
32	2SC403SP	BUFFER
33	2SC3068	BUFFER
34	2SC403SP	CCD CLOCK GEN
35	2SC403SP	CCD CLOCK GEN
36	2SC403SP	BUFFER
38	2SC403SP	BUFFER
101	2SB734	SYSTEM SWITCH
102	2SD789	SYSTEM SWITCH
103	DTA124ES	COMB. SWITCH
104	DTA124ES	COMB. SWITCH
D1	1SS119	SYSTEM SWITCH
2	1SS119	COMB. SWITCH
4	RD3.0EB1	CCD BIAS
5	RD9.1EB2	SWITCH BIAS
6	1SS119	KILLER SWITCH
10	1T25	PHASE CONTROL
11	1SS119	PAL S/D SWITCH
12	RD12EB2	PHASE SWITCH
13	RD12EB2	SYSTEM SWITCH
16	1SS119	COMB SW
201	1SS119	PROTECTOR
202	1SS119	PROTECTOR

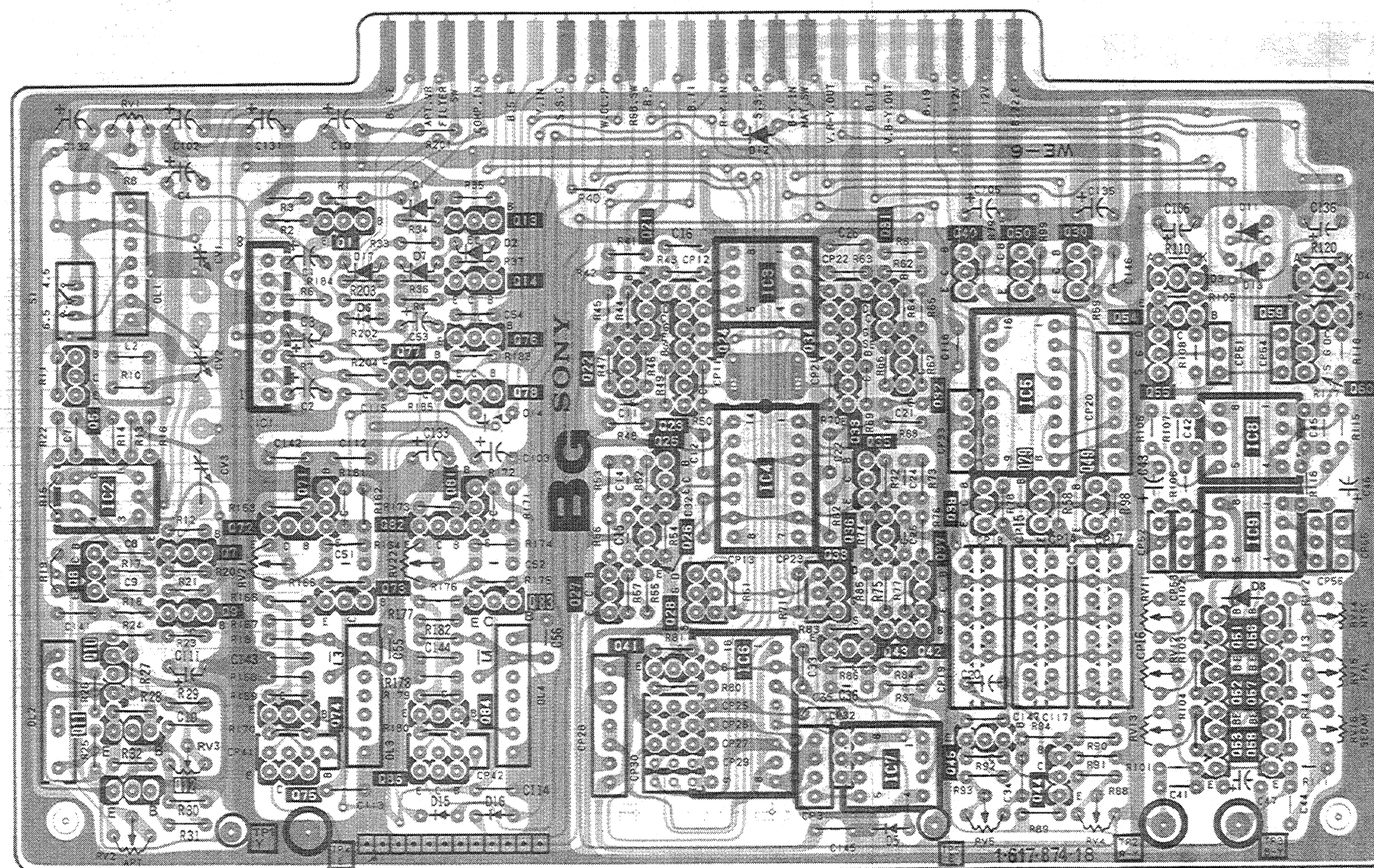


• : Pattern from the side which enables seeing.  
• : Pattern of the rear side.



BG board (COLOR GAIN CONTROL, COMPONENT R-Y AMP & DELAY, APERTURE CONTROL,  
Y DELAY, NTSC MATRIX SW, G-Y MATRIX AMP)

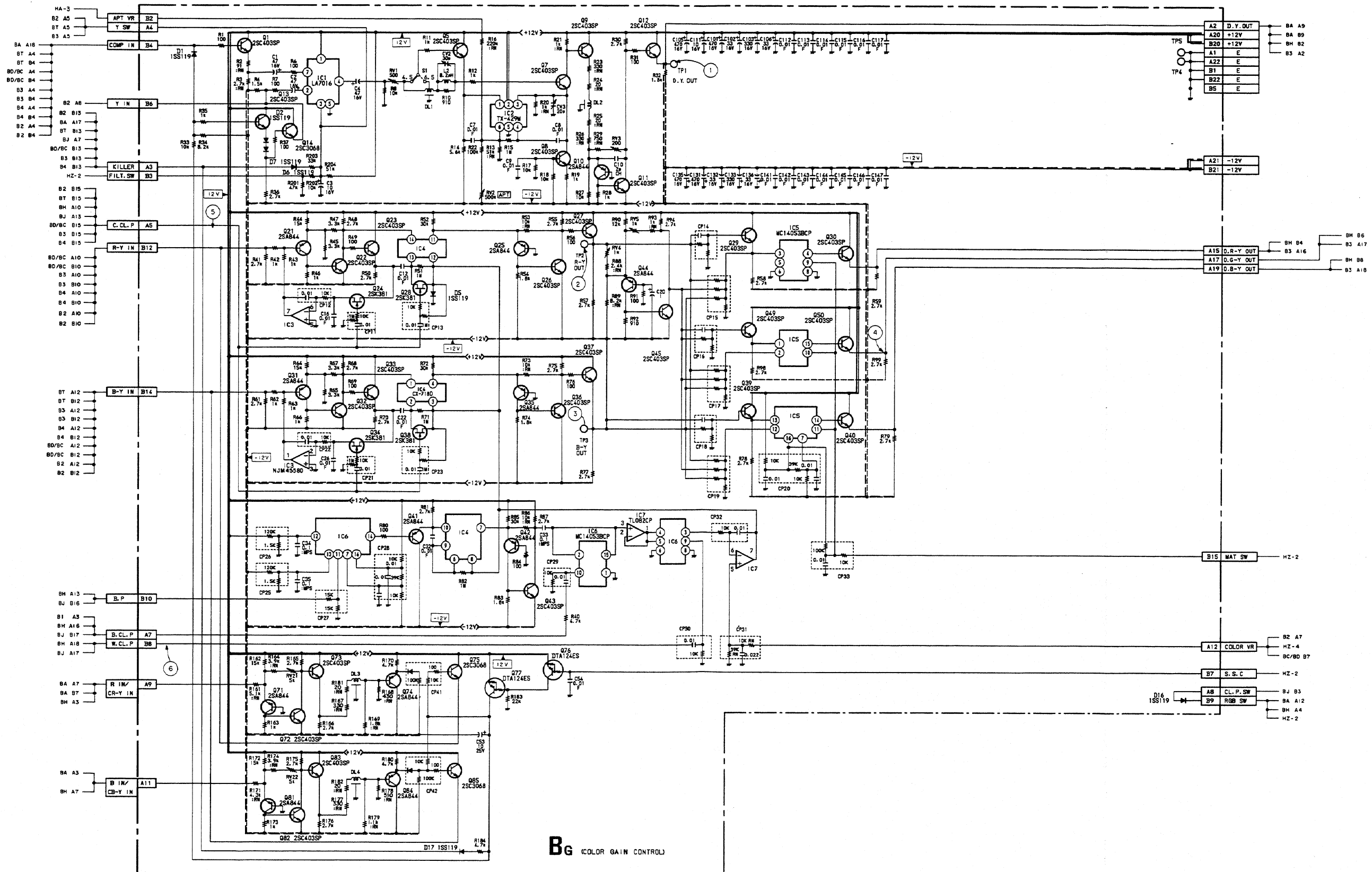
IC	1	3	4	5	6	7	40	50	30
Q	5	8	7	72	71	77	73	74	75
D	17	6	7	2	15	16	5	45	44
TP	RV1	CV2	CV3	RV21	RV22	RV11	RV12	RV13	RV14
ADJ	RV2	TP1	TP4	TP5	RV5	RV4	TP2	TP3	RV15



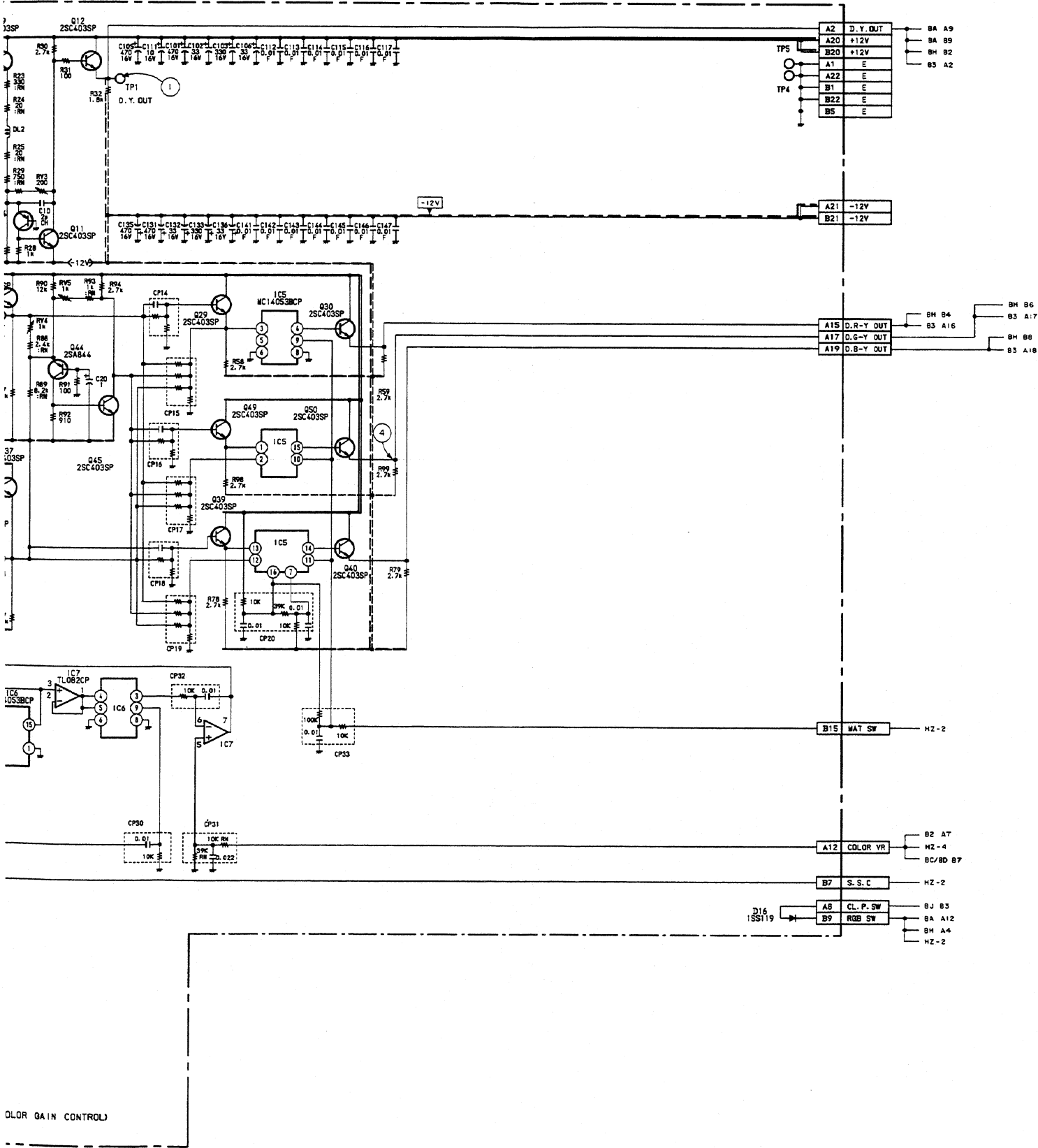
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

**BG board (COLOR GAIN CONTROL, COMPONENT R-Y AMP & DELAY, APERUTURE CONTROL,  
Y DELAY, NTSC MATRIX SW, G-Y MATRIX AMP)**

B G B (

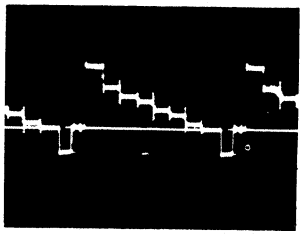


BG BOARD

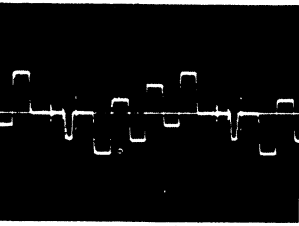


IC1	LA7016	FILTER SW
2	TX-429M	APERTURE
3	NJM4558D	COLOR DIFFERENCE CLAMP
4	CX-718D	CHROMA CONTROL
5	MC14053BCP	MATRIX SW
6	MC14053BCP	CHROMA CONTROL
7	TL082CP	CHROMA CONTROL
Q1	2SC403SP	BUFF
5	2SC403SP	APERTURE
7	2SC403SP	APERTURE
8	2SC403SP	APERTURE
9	2SC403SP	Y DELAY
10	2SA844	Y AMP
11	2SC403SP	Y AMP
12	2SC403SP	Y AMP
13	2SC403SP	BUFF
14	2SC3068	BUFF
21	2SA844	R-Y AMP
22	2SC403SP	R-Y AMP
23	2SC403SP	R-Y CLAMP
24	2SK381	R-Y CLAMP
25	2SA844	R-Y CHROMA CONTROL
26	2SC403SP	R-Y CHROMA CONTROL
27	2SC403SP	R-Y CHROMA CONTROL
28	2SK381	R-Y CHROMA CONTROL
29	2SC403SP	R-Y BUFF
30	2SC403SP	R-Y BUFF
31	2SA844	B-Y AMP
32	2SC403SP	B-Y AMP
33	2SC403SP	B-Y CLAMP
34	2SK381	B-Y CLAMP
35	2SA844	B-Y CHROMA CONTROL
36	2SC403SP	B-Y CHROMA CONTROL
37	2SC403SP	B-Y CHROMA CONTROL
38	2SK381	B-Y CHROMA CONTROL
39	2SC403SP	B-Y BUFF
40	2SC403SP	B-Y BUFF
41	2SA844	CHROMA CONTROL
42	2SA844	CHROMA CONTROL
43	2SC403SP	CHROMA CONTROL

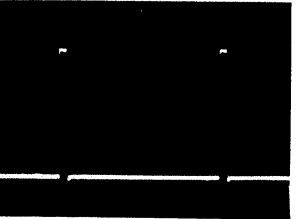
Q44	2SA844	CHROMA CONTROL
45	2SC403SP	CHROMA CONTROL
49	2SC403SP	G-Y BUFF
50	2SC403SP	G-Y BUFF
71	2SA844	R-Y AMP
72	2SC403SP	R-Y AMP
73	2SC403SP	R-Y AMP
74	2SA844	R-Y DELAY
75	2SC3068	R-Y BUFF
76	DTA124ES	COMPONENT SW
77	DTA124ES	COMPONENT SW
81	2SA844	B-Y AMP
82	2SC403SP	B-Y AMP
83	2SC403SP	B-Y AMP
84	2SA844	B-Y DELAY
85	2SC3068	B-Y BUFF
D1	1SS119	COMPONENT SW
2	1SS119	DC SHIFT SW
5	1SS119	PROTECT
6	1SS119	DC SHIFT
7	1SS119	FILTER SW
16	1SS119	R.G.B. SW
17	1SS119	KILLER



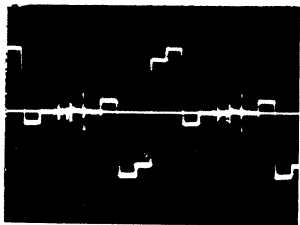
① 1.0Vp-p (H)



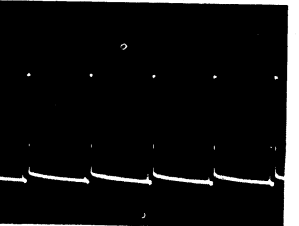
③ 1.7Vp-p (H)



⑤ 4.8Vp-p (H)



② 1.4Vp-p (H)



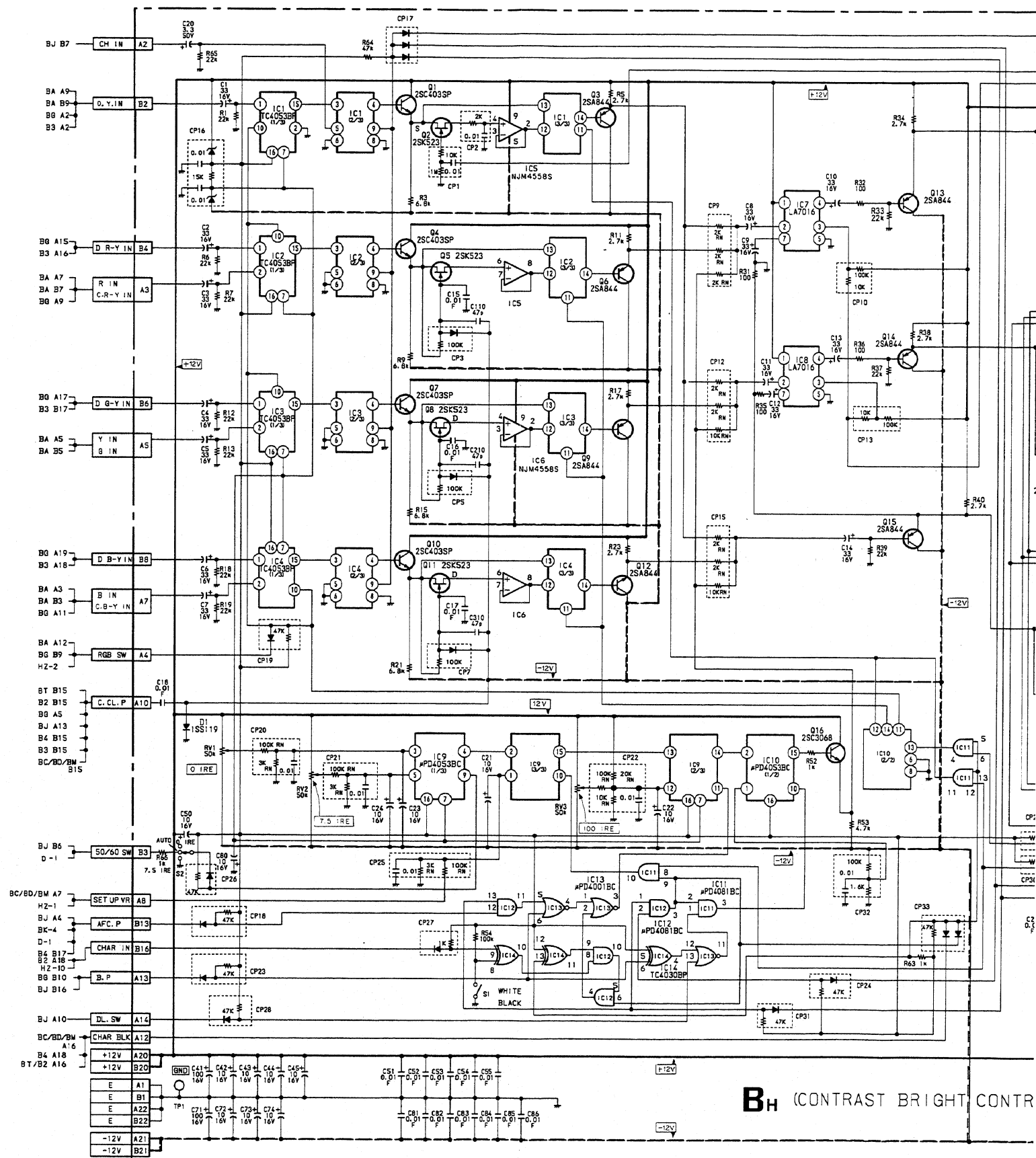
⑥ 12Vp-p (H)

BH BOARD

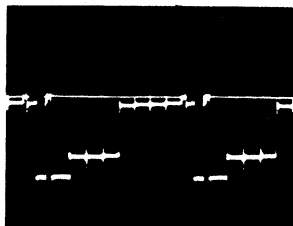
IC1 (1/3)	TC4053BP	COMPOSITE/R.G.B. CHANGE SW
(2/3)		SET UP & CROSS HATCH SW
(3/3)		SCREENING SW
2 (1/3)	TC4053BP	COMPOSITE/R.G.B. CHANGE SW
(2/3)		SET UP SW
(3/3)		SCREENING SW
3 (1/3)	TC4053BP	COMPOSITE/R.G.B. CHANGE SW
(2/3)		SET UP SW
(3/3)		SCREENING SW
4 (1/3)	TC4053BP	COMPOSITE/R.G.B. CHANGE SW
(2/3)		SET UP SW
(3/3)		SCREENING SW
5	NJM4558S	SAMPLE HOLD
6	NJM4558S	SAMPLE HOLD
7	LA7016	BLUE ONLY SW
8	LA7016	BLUE ONLY SW
9	MC14053BCP	AGC PULSE, SET UP, WHITE, VITC INSERT GEN
10 (1/2)	MC14053BCP	AGC PULSE, SET UP, WHITE, VITC INSERT GEN
(2/2)		COLOR DIFFERENCE & R.G.B. SCREENING PULSE GEN
11 (1/4)		AGC PULSE, SET UP, WHITE, VITC INSERT GEN
(3/4)		COLOR DIFFERENCE & R.G.B. SCREENING PULSE GEN
(2/4)	MC14081BCP	Y SCREENING PULSE GEN
(4/4)		AGC PULSE, SET UP, WHITE, VITC INSERT GEN
12	MC14081BCP	AGC PULSE, SET UP, WHITE, VITC INSERT GEN
13	MC14001BCP	AGC PULSE, SET UP, WHITE, VITC INSERT GEN
14	TC4030BP	AGC PULSE, SET UP, WHITE, VITC INSERT GEN
101	TX-429M	R CONTRAST CONTROL
102	TL082CP	R CONTRAST & BRIGHT CONTROL
201	TX-429M	G CONTRAST CONTROL
202	TL082CP	G CONTRAST & BRIGHT CONTROL
301	TX-429M	B CONTRAST CONTROL
302	TL082CP	B CONTRAST & BRIGHT CONTROL
Q1	2SC403SP	Y BUFF
2	2SK523	Y SAMPLE HOLD
3	2SA844	Y BUFF
4	2SC403SP	R-Y/R BUFF

Q5	2SK523	R-Y/Y SAMPLE HOLD
6	2SA844	R-Y/R BUFF
7	2SC403SP	G-Y/Y SAMPLE HOLD
8	2SK523	G-Y/G BUFF
9	2SA844	G-Y/G BUFF
10	2SC403SP	B-Y/B BUFF
11	2SK523	B-Y/B SAMPLE HOLD
12	2SA844	B-Y/B BUFF
13	2SA844	R BUFF
14	2SA844	G BUFF
15	2SA844	B BUFF
16	2SC3068	AGC PULSE BUFF
101	2SK381	R CONTRAST CONTROL
102	2SA844	R AMP
103	2SC403SP	R AMP
104	2SC403SP	R LIMITER
105	2SC403SP	R LIMITER
106	2SK381	R BRIGHT CONTROL
107	2SK381	R CONTRAST CONTROL
108	2SK381	R CONTRAST CONTROL
201	2SK381	G CONTRAST CONTROL
202	2SA844	G AMP
203	2SC403SP	G AMP
204	2SC403SP	G LIMITER
205	2SC403SP	G LIMITER
206	2SK381	G BRIGHT CONTROL
207	2SK381	G CONTRAST CONTROL
208	2SK381	G CONTRAST CONTROL
301	2SK381	B CONTRAST CONTROL
302	2SA844	B AMP
303	2SC403SP	B AMP
304	2SC403SP	B LIMITER
305	2SC403SP	B LIMITER
306	2SK381	B BRIGHT CONTROL
307	2SK381	B CONTRAST CONTROL
308	2SK381	B CONTRAST CONTROL
D1	1SS119	
101	1SS119	R LIMITER
102	1SS119	R PROTECT
201	1SS119	G LIMITER
202	1SS119	G PROTECT
301	1SS119	B LIMITER
302	1SS119	B PROTECT

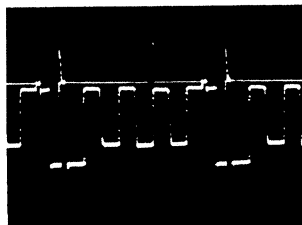
BH board (Y/COLOR DIFFERENCE/RGB SIGNAL SWITCHING, Y-C MATRIX, CONTRAST/BRIGHTNESS CONTROL)



① 1.2Vp-p (H)



② 1.2Vp-p (H)



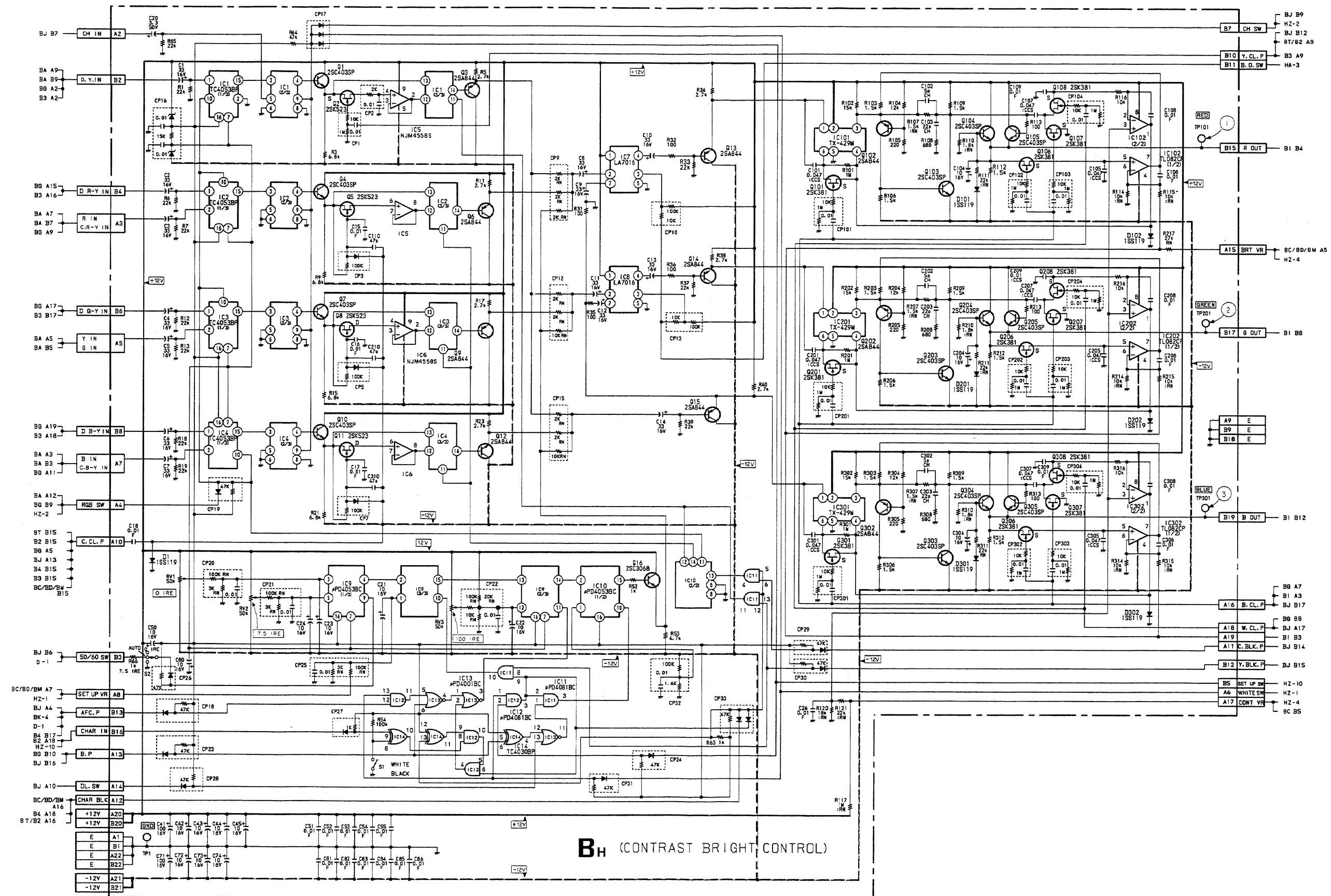
③ 1.2Vp-p (H)

BH (CONTRAST BRIGHT CONTR



BH BH

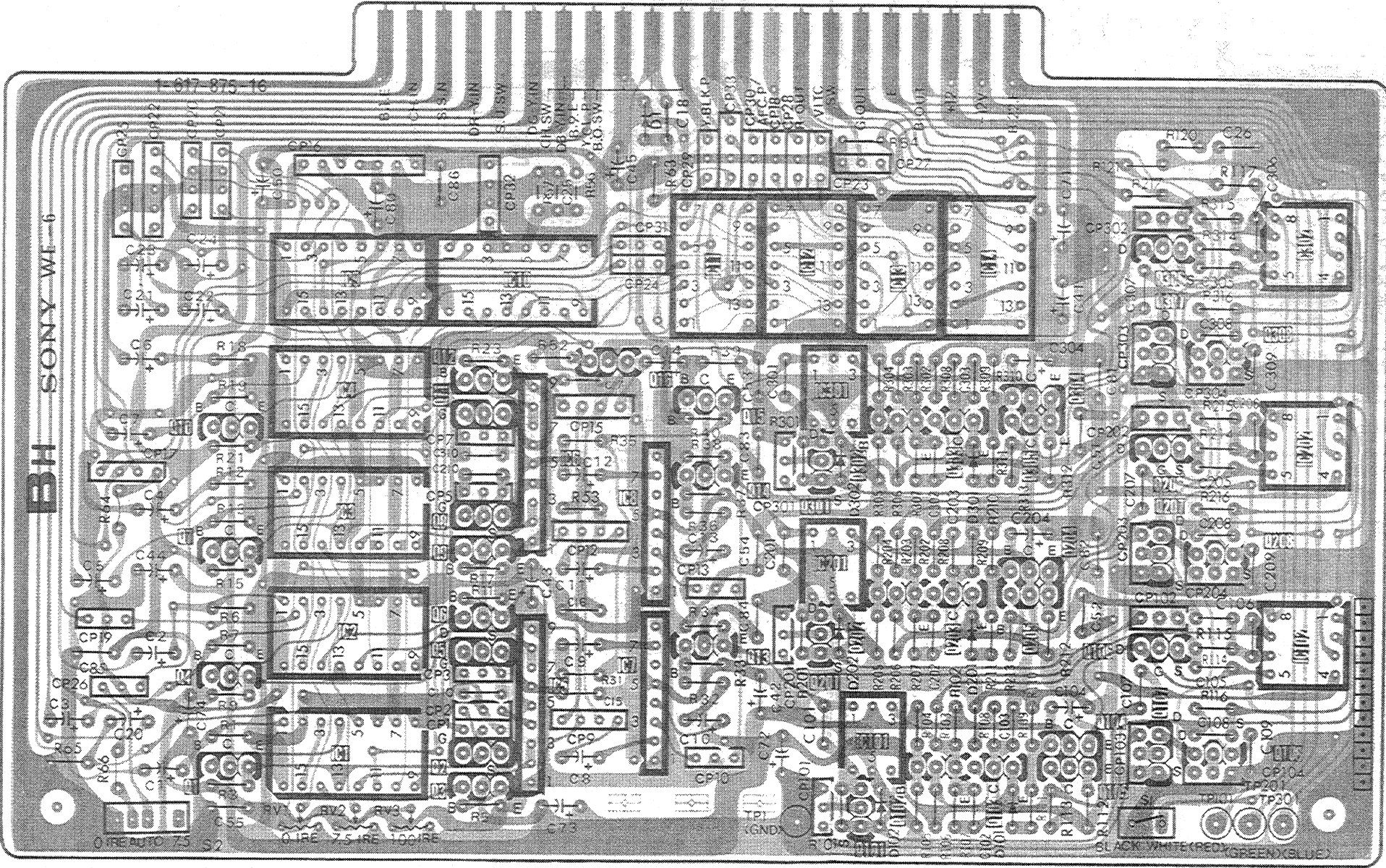
BH board (Y/COLOR DIFFERENCE/RGB SIGNAL SWITCHING, Y-C MATRIX, CONTRAST/BRIGHTNESS CONTROL)





BH board (Y/COLOR DIFFERENCE/RGB SIGNAL SWITCHING, Y-C MATRIX, CONTRAST/BRIGHTNESS CONTROL)

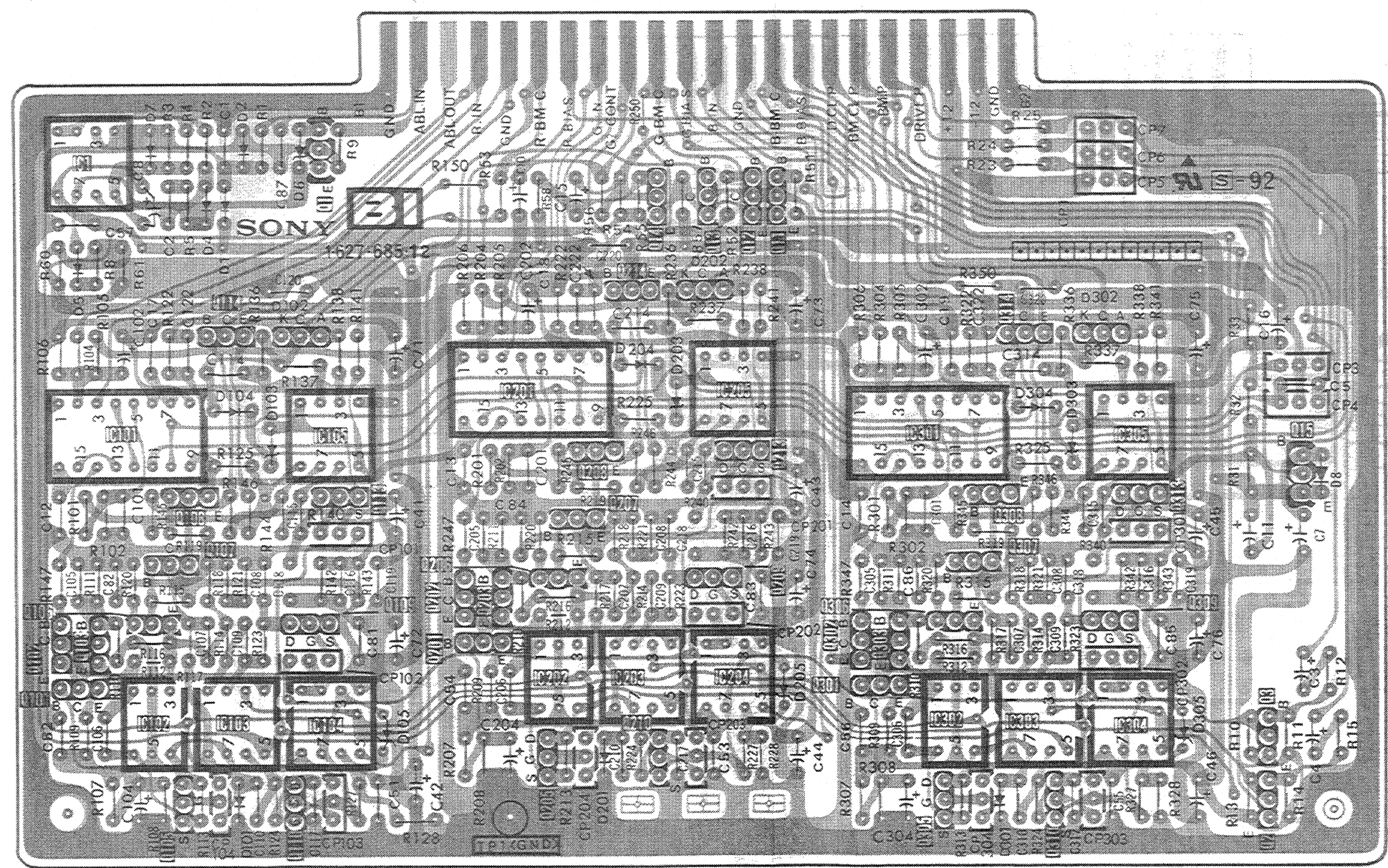
IC		9 4 3 2 1		10 6 5		11 8 7		12 301 201 101		13		14		102 202 302
Q		10 7 4 1		12 11 8 9 6 5 2 3		16 15 14 13		301 302 201 101		302 303 202 102		304 305 204 203 104 105		306 307 206 207 106 107 108
D														
TP ADJ				RV1	RV2	RV3		TP1						TP201 TP101 TP301



- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

BI board (DRIVE CONTROL, BEAM CURRENT CONTROL)

IC	101	105	201	205	301	305											
	102	103	104	202	203	204	302	303	304								
Q		114	113	208	209	213	314	313	15								
	102	103	106	107	109	202	203	206	207	209	302	303	306	307	308	309	3
	101		105		110	201	203	205	210		301		305		310		2
D	5	7	4	1	2	6											
				102					202						302		
			104	103				204	203					304	303		8
					105					205						305	
			101					201					301				
TP																	

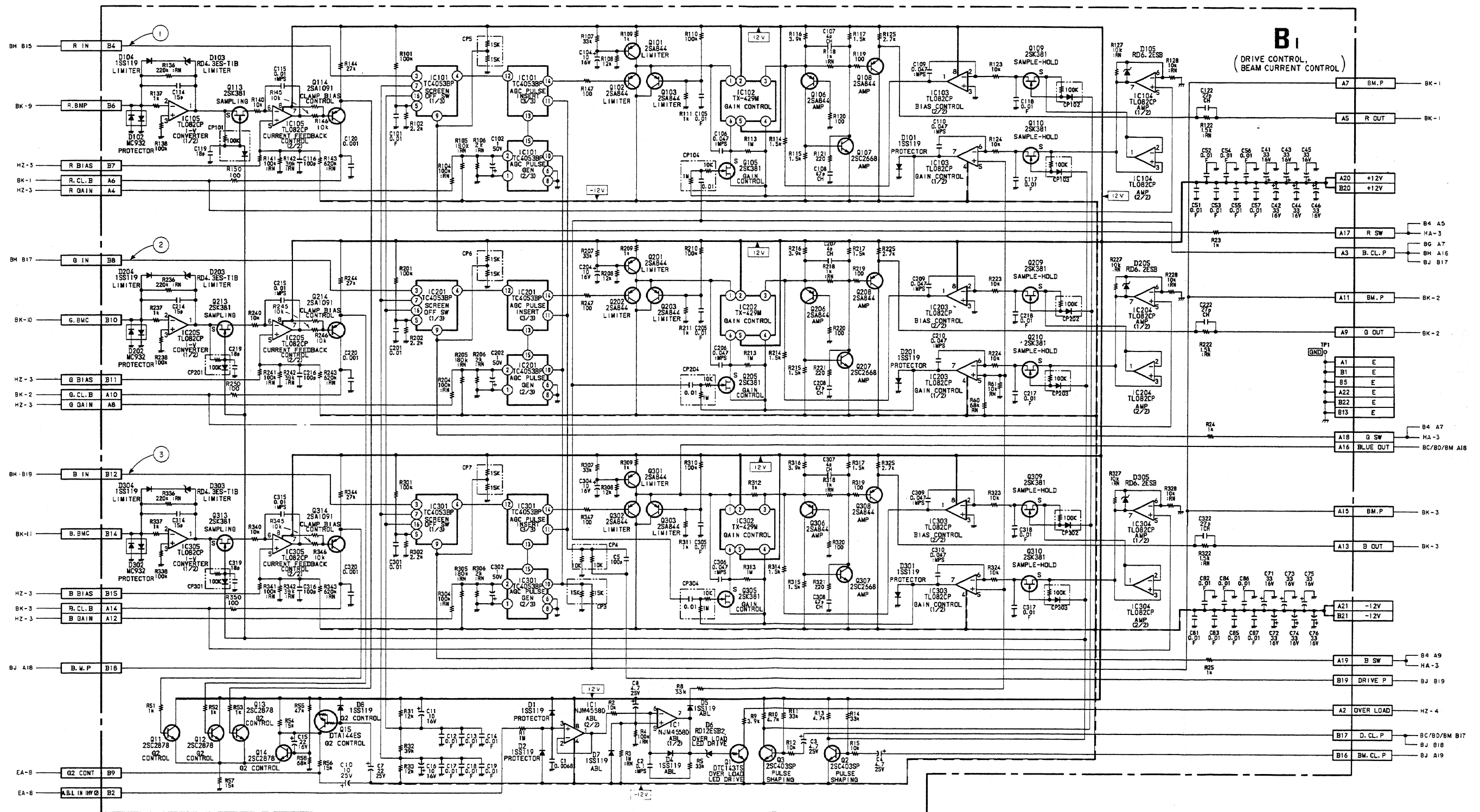


- : Pattern from the side which enables seeing.
- : Pattern of the rear side.



## BI board (DRIVE CONTROL, BEAM CURRENT CONTROL)

BI B



IC
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
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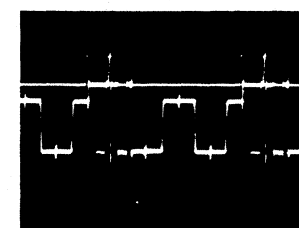
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## BI BOARD

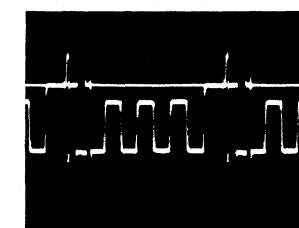
IC1	NJM4558D	ABL
101(1/3)	TC4053BP	SCREEN OFF SW
(2/3)		AGC PULSE GEN
(3/3)		AGC PULSE INSERT
102	TX-429M	GAIN CONTROL
103(1/2)	TL082CP	GAIN CONTROL
(2/2)		BIAS CONTROL
104	TL082CP	AMP
105(1/2)	TL082CP	I-V CONVERTER
(2/2)		CURRENT FEEDBACK CONTROL
201(1/3)	TC4053BP	SCREEN OFF SW
(2/3)		AGC PULSE GEN
(3/3)		AGC PULSE INSERT
202	TX-429M	GAIN CONTROL
203(1/2)	TL082CP	GAIN CONTROL
(2/2)		BIAS CONTROL
204	TL082CP	AMP
205(1/2)	TL082CP	I-V CONVERTER
(2/2)		CURRENT FEEDBACK CONTROL
301(1/3)	TC4053BP	SCREEN OFF SW
(2/3)		AGC PULSE GEN
(3/3)		AGC PULSE INSERT
302	TX-429M	GAIN CONTROL
303(1/2)	TL082CP	GAIN CONTROL
(2/2)		BIAS CONTROL
304	TL082CP	AMP
305(1/2)	TL082CP	I-V CONVERTER
(2/2)		CURRENT FEEDBACK CONTROL
Q1	DTC143TS	OVER LOAD LED DRIVE
2	ZSC403SP	PULSE SHAPING
3	ZSC403SP	PULSE SHAPING
11	ZSC2878	G2 CONTROL
12	ZSC2878	G2 CONTROL
13	ZSC2878	G2 CONTROL
14	ZSC2878	G2 CONTROL
15	DTA144ES	G2 CONTROL
101	2SA844	LIMITER
102	2SA844	LIMITER
103	2SA844	LIMITER
105	2SK381	GAIN CONTROL
106	2SA844	AMP
107	ZSC2668	AMP
108	2SA844	AMP
109	2SK381	SAMPLE-HOLD

Q110	2SK381	SAMPLE-HOLD
113	2SK381	SAMPLE-HOLD
114	2SA1091	CLAMP BIAS CONTROL
201	2SA844	LIMITER
202	2SA844	LIMITER
203	2SA844	LIMITER
205	2SK381	GAIN CONTROL
206	2SA844	AMP
207	ZSC2668	AMP
208	2SA844	AMP
209	2SK381	SAMPLE-HOLD
210	2SK381	SAMPLE-HOLD
213	2SK381	SAMPLE-HOLD
214	2SA1091	CLAMP BIAS CONTROL
301	2SA844	LIMITER
302	2SA844	LIMITER
303	2SA844	LIMITER
305	2SK381	GAIN CONTROL
306	2SA844	AMP
307	ZSC2668	AMP
308	2SA844	AMP
309	2SK381	SAMPLE-HOLD
310	2SK381	SAMPLE-HOLD
313	2SK381	SAMPLE-HOLD
314	2SA1091	CLAMP BIAS CONTROL
D1	1SS119	PROTECTOR
2	1SS119	PROTECTOR
4	1SS119	ABL
5	1SS119	ABL
6	RD12ESB2	OVER LOAD LED DRIVE
7	1SS119	ABL
8	1SS119	G2 CONTROL
101	1SS119	PROTECTOR
102	MC932	PROTECTOR
103	RD4.3ES-T18	LIMITER
104	1SS119	LIMITER
D105	RD6.2ESB	LIMITER
201	1SS119	PROTECTOR
202	MC932	PROTECTOR
203	RD4.3ES-T18	LIMITER
204	1SS119	LIMITER
D205	RD6.2ESB	LIMITER
301	1SS119	PROTECTOR
302	MC932	PROTECTOR
303	RD4.3ES-T18	LIMITER
304	1SS119	LIMITER
D305	RD6.2ESB	LIMITER

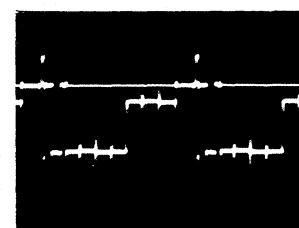
5. DIAGRAMS



① 1.0Vp-p(H)



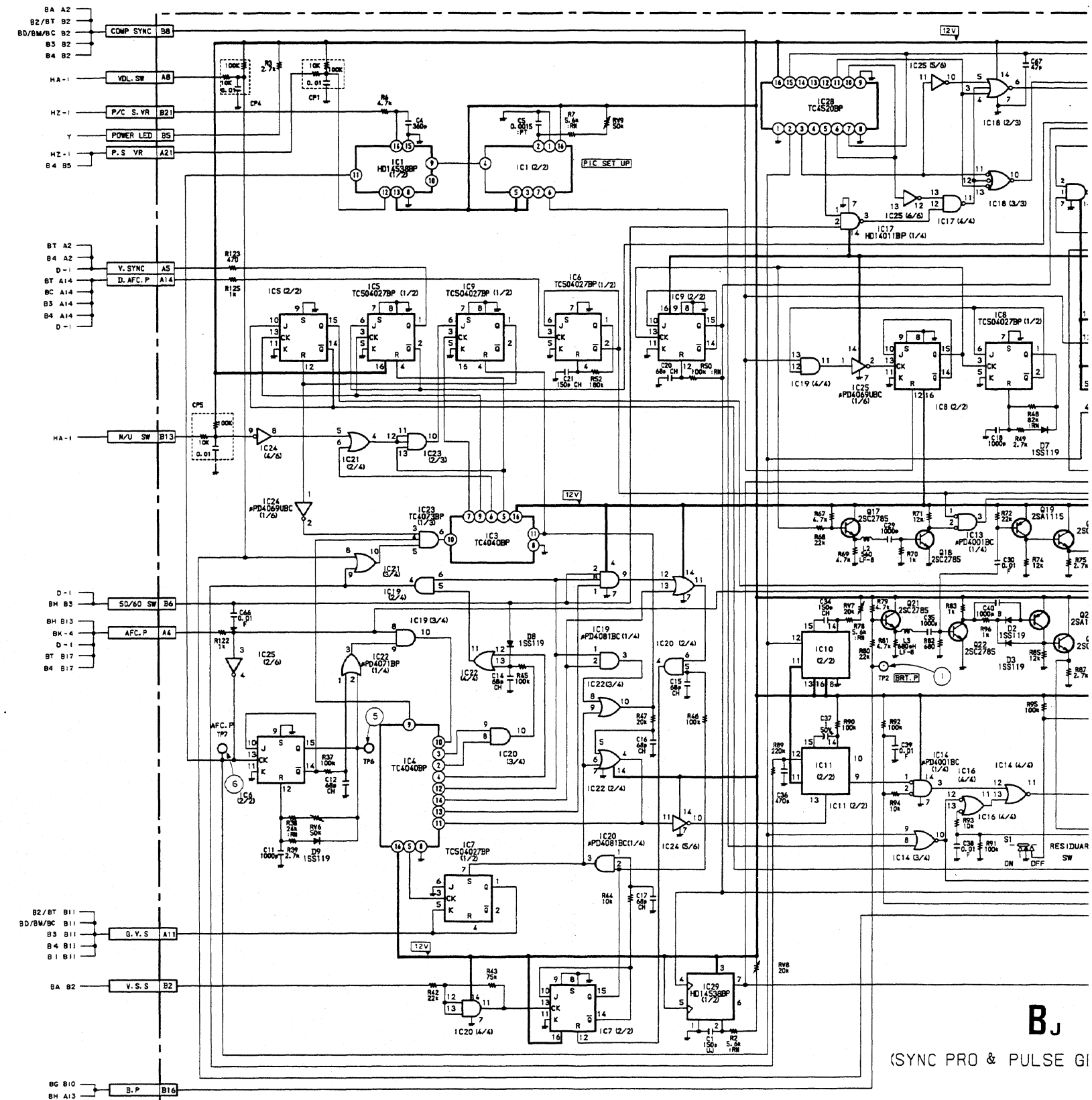
③ 1.0Vp-p(H)



② 1.0Vp-p(H)

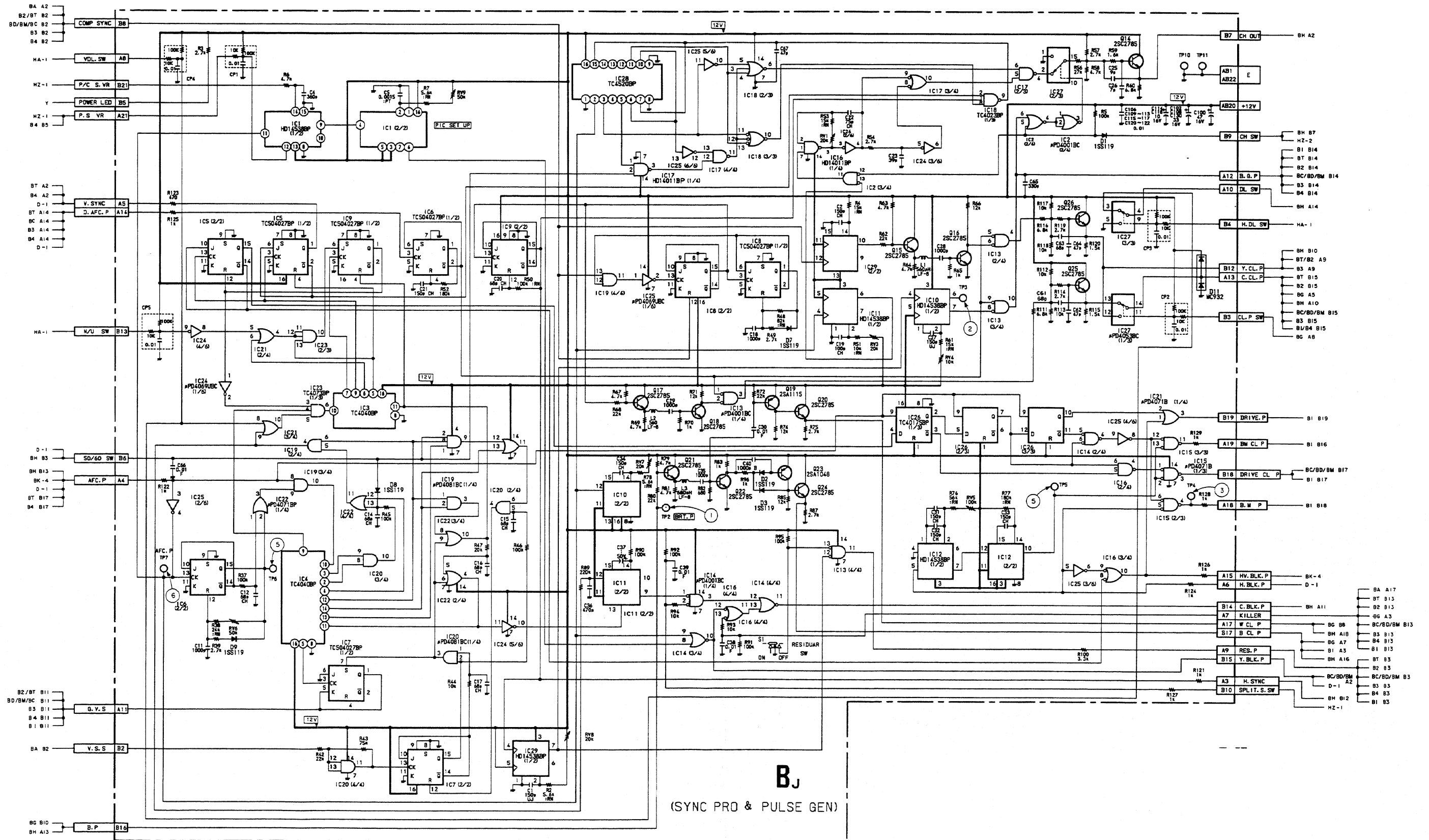
## 5-47

IC23(1/3)		V SYNC & DELAY
(2/3)	TC4073BP	
(3/3)		V COUNT
24(1/5)		V SYNC & DELAY
(4/5)		
(2/5)	HC14069UBCP	CROSS HATCH GEN
(3/5)		V COUNT
(5/5)		1H PULSE PROCESS
25(1/6)		INV
(2/6)		H OR V BLK.P
(3/6)	HC14069UBCP	Y CYCLE AGC & CLAMP PULSE GEN
(4/6)		CROSS HATCH GEN
(5/6)		
(6/6)		
26	HC14175BCP	1H PULSE PROCESS
27(1/3)		CLAMP PULSE CHANGE SW
(2/3)	HC14053BCP	CROSS HATCH GEN
(3/3)		H OR V DL SW
28	TC4520BP	CROSS HATCH GEN
29(1/2)	HD14538BP	B.G.P GEN 1
(2/2)		Y.CL.P GEN
Q14	2SC2785	CROSS HATCH GEN
15	2SC2785	Y.CL.P GEN
16	2SC2785	Y.CL.P GEN
17	2SC2785	CHROMA CLAMP PULSE GEN
18	2SC2785	CHROMA CLAMP PULSE GEN
19	2SA1115	H CYCLE
20	2SC2785	H CYCLE
21	2SC2785	H CYCLE
22	2SC2785	H CYCLE
23	2SA1048	H CYCLE
24	2SC2785	H CYCLE
25	2SC2785	CHROMA CLAMP PULSE GEN
26	2SC2785	Y.CL.P GEN
D1	1SS119	CROSS HATCH GEN
2	1SS119	H CYCLE
3	1SS119	H CYCLE
7	1SS119	1H PULSE PROCESS
8	1SS119	V SYNC & DELAY
9	1SS119	2FH MULTI
11	HC932	PROT



BJ

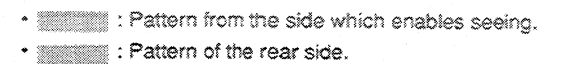
## BJ board (SYNC PROCESSING &amp; PULSE GEN)





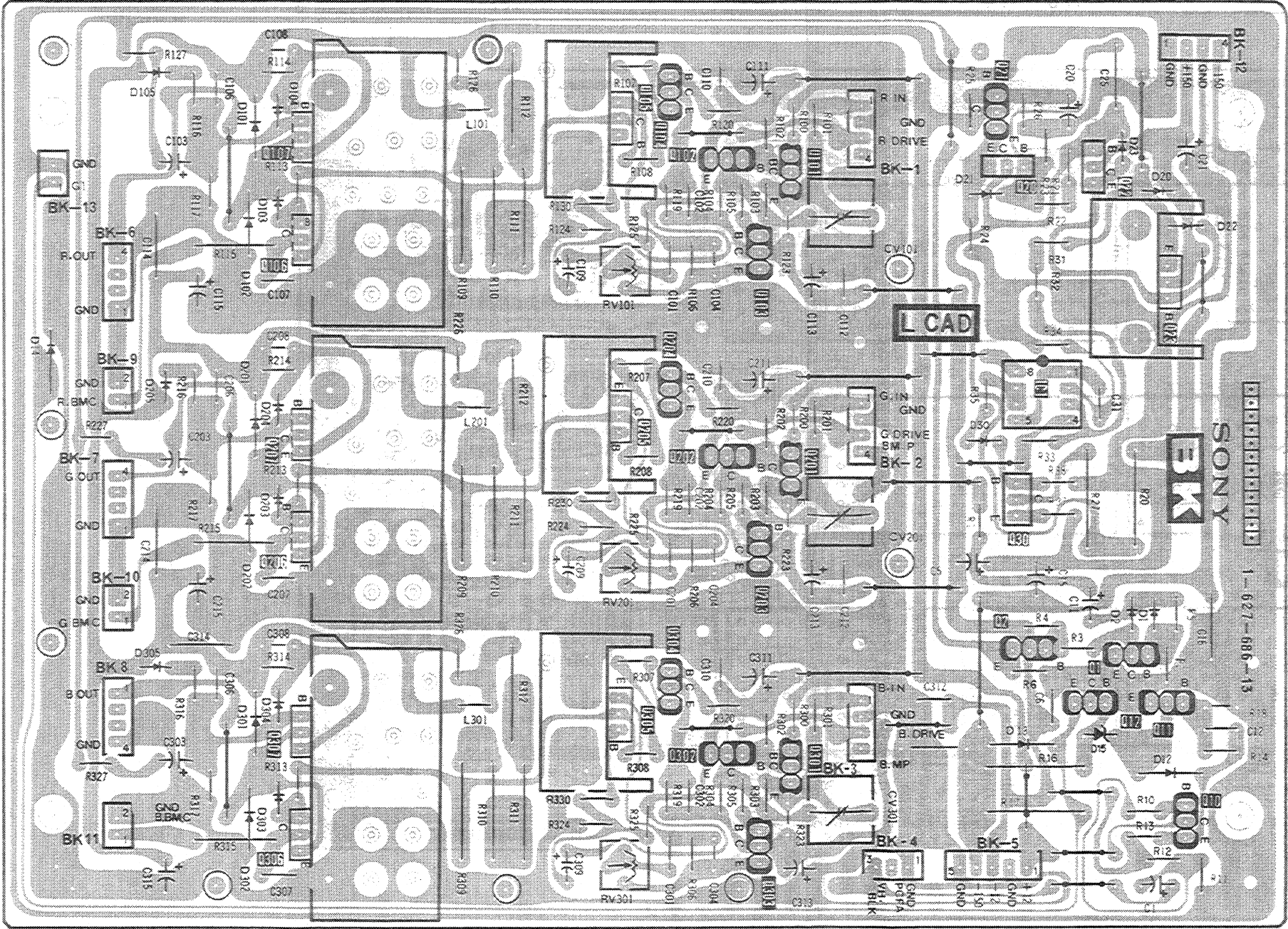
8X postcard (141360 OUT AMR)

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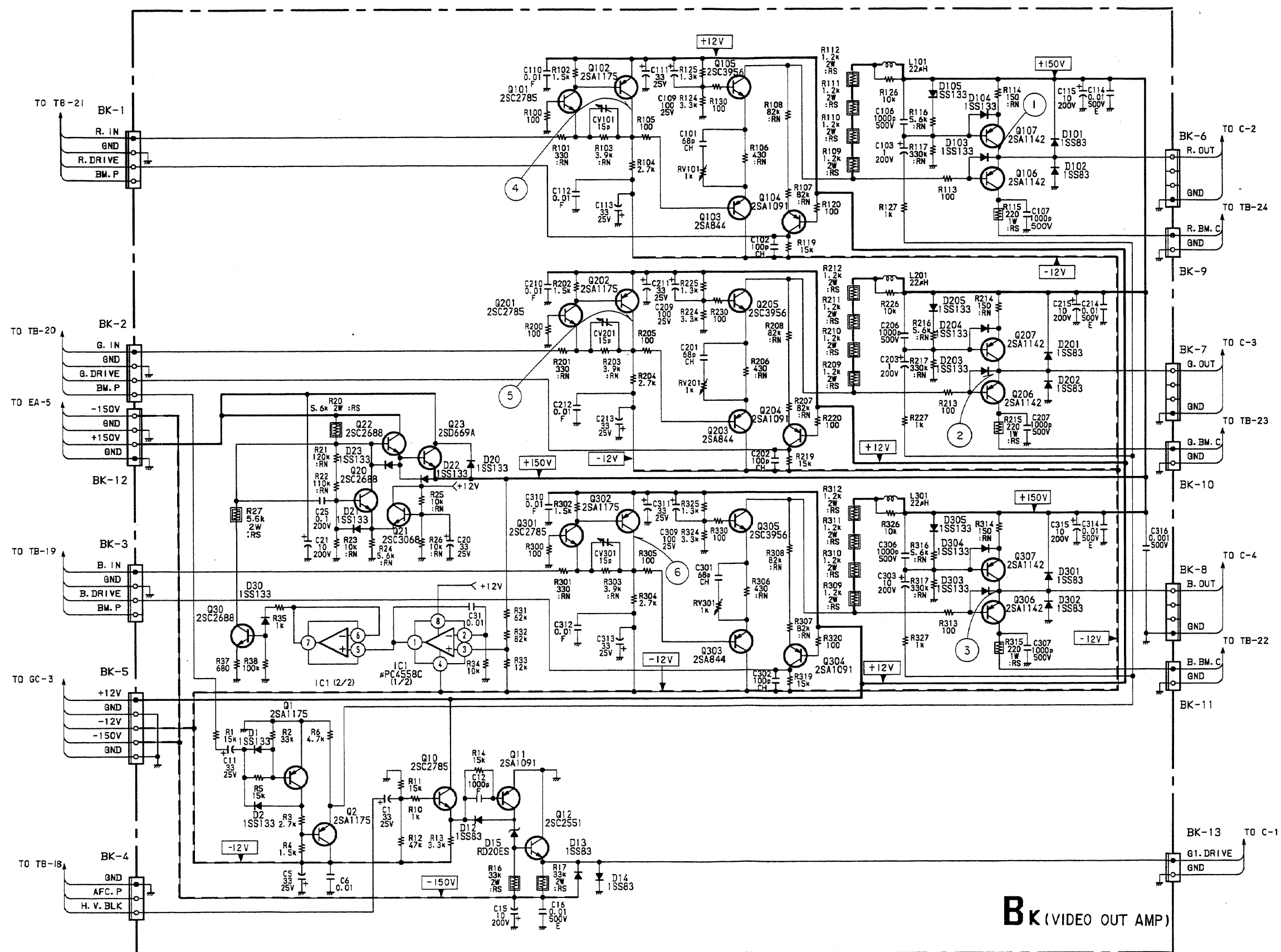


BK board (VIDEO OUT AMP)

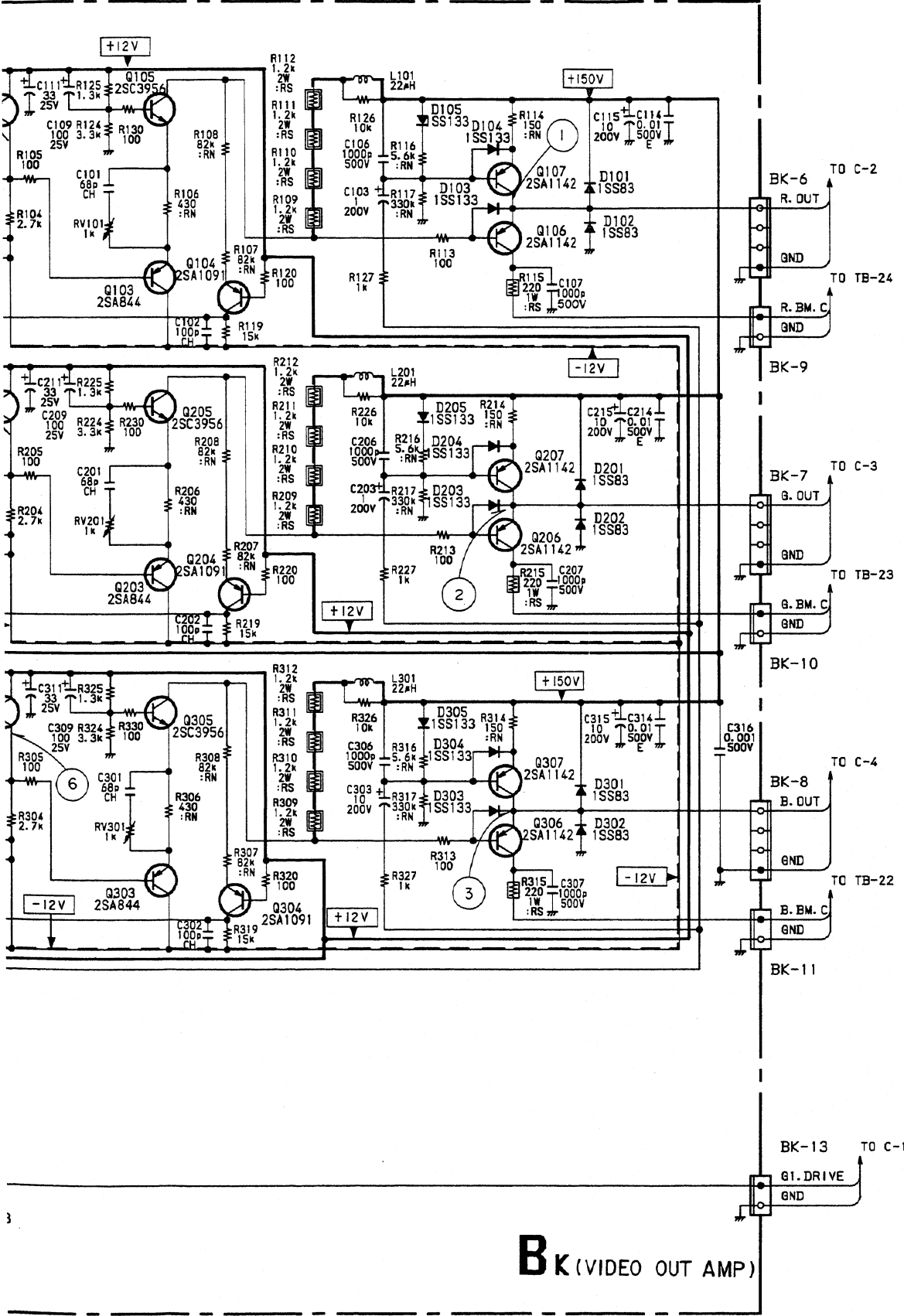
IC										
Q		107 106 207 206 307 306			105 104 205 204 305 302	101 102 201 202 304 303	103 101 203 201 303 301		21 20 30 2	22 1 12 11 10
D	14	105 205 305	101 102 201 202 301 302	104 103 204 203 304 303				21 30 13		23 20 2 1 12
ADJ					RV101 RV301	RV201	CV101 CV301	CV201		





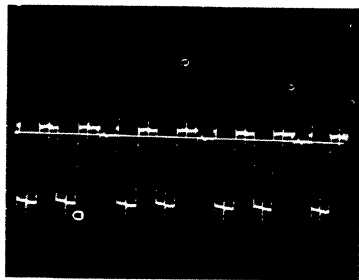


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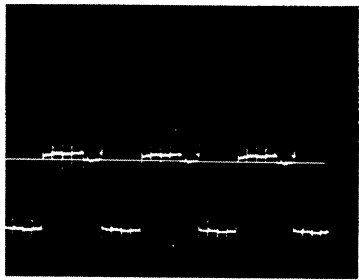


BK BOARD

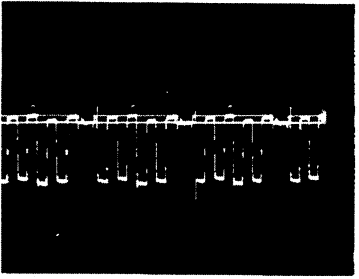
IC1	UPC4558C	LIPPLE FILTER
Q1	2SA1175	INVERTER
2	2SA1175	BUFF.
10	2SC2785	BUFF.
11	2SA1091	BUFF.
12	2SC2551	BUFF.
20	2SC2688	LIPPLE FILTER
21	2SC3068	LIPPLE FILTER
22	2SC2688	LIPPLE FILTER
23	2SD669A	LIPPLE FILTER
30	2SC2688	LIPPLE FILTER
101	2SC2785	R-PRE AMP.
102	2SA1175	R-PRE AMP.
103	2SA844	BUFF.
104	2SA1091	BUFF.
105	2SC3956	BUFF.
106	2SA1142	R-VIDEO OUT
107	2SA1142	R-VIDEO OUT
201	2SC2785	G-PRE AMP.
202	2SA1175	G-PRE AMP.
203	2SA844	BUFF.
204	2SA1091	BUFF.
205	2SC3956	BUFF.
206	2SA1142	G-VIDEO OUT
207	2SA1142	G-VIDEO OUT
301	2SC2785	B-PRE AMP.
302	2SA1175	B-PRE AMP.
303	2SA844	BUFF.
304	2SA1091	BUFF.
305	2SC3956	BUFF.
306	2SA1142	B-VIDEO OUT
307	2SA1142	B-VIDEO OUT
D1	1SS133	INVERTER
2	1SS133	INVERTER
12	1SS83	PROTECTOR
13	1SS83	BIAS
14	1SS83	PROTECTOR
15	RD20ES-TB	BIAS
20	1SS133	PROTECTOR
21	1SS133	PROTECTOR
22	1SS133	PROTECTOR
23	1SS133	PROTECTOR
30	1SS133	PROTECTOR
101	1SS83	PROTECTOR
102	1SS83	PROTECTOR
103	1SS133	PROTECTOR
104	1SS133	PROTECTOR
105	1SS133	BIAS
201	1SS83	PROTECTOR
202	1SS83	PROTECTOR
203	1SS133	PROTECTOR
204	1SS133	PROTECTOR
205	1SS133	BIAS
301	1SS83	PROTECTOR
302	1SS83	PROTECTOR
303	1SS133	PROTECTOR
304	1SS133	PROTECTOR
305	1SS133	BIAS



① 30 Vp-p(H)  
④ 3 Vp-p(H)



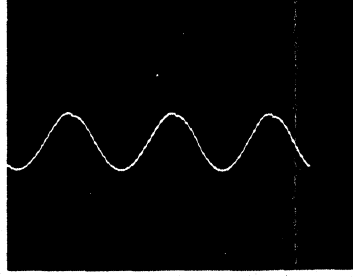
② 35 Vp-p(H)  
⑤ 3.5 Vp-p(H)



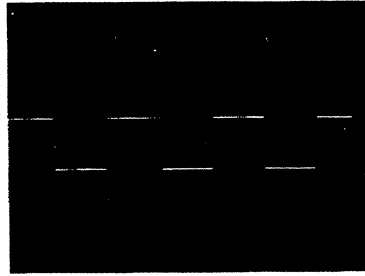
③ 30 Vp-p(H)  
⑥ 3 Vp-p(H)

**D BOARD**

## 5. DIAGRAMS



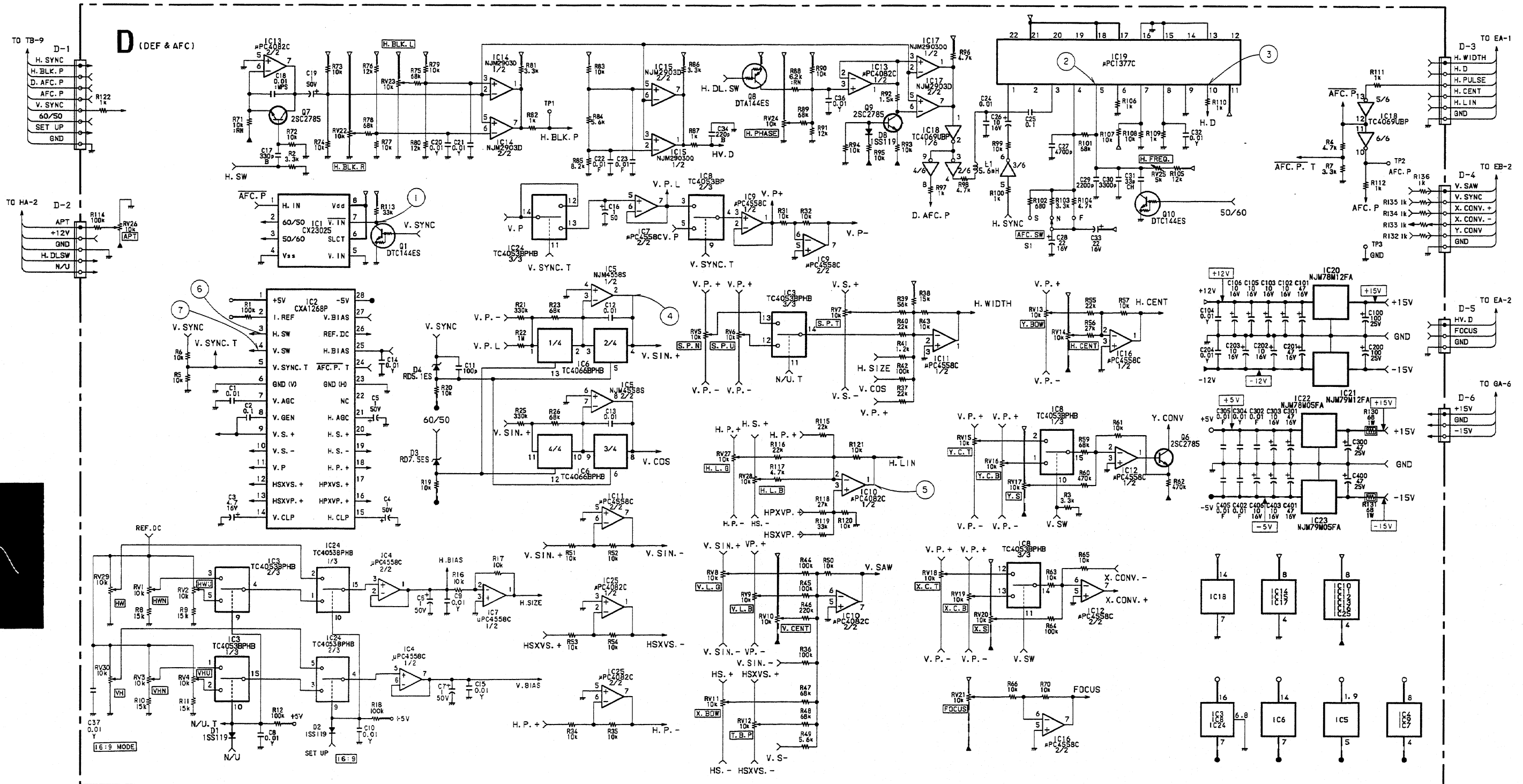
④ 1 Vp-p(V)



⑦ 3.2  $V_{p-p}(V)$



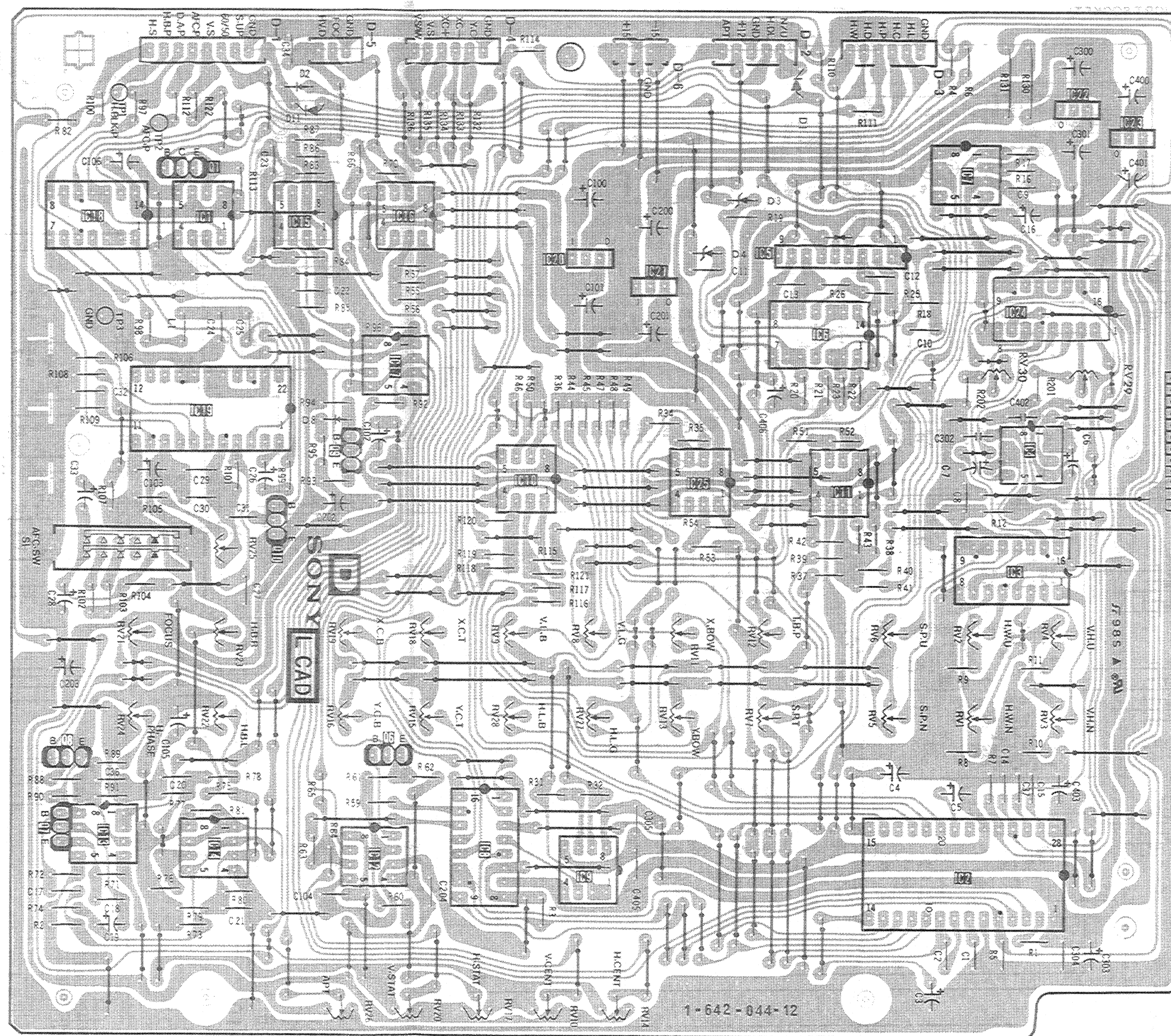
D board (DEF & AFC)





D board (DEF & AFC)

IC	Q	D,RV	TP
22		D2	1
23		D1	2
7	1		
18 15 16		D3	
20 5		D4	
21			
24			3
6			
17			30,29
19		D8	
4	9		
10 25 11			
10			
3		25	
		21,23,19,18,9,8,11,12,6,2,4	
		24,22,16,15,28,27,13,7,5,1,3	
	8,6		
	7		
13 14 8			
12 9	2		
		26,20,17,10,14	







EA BOARD

IC1	UPC1394C	P.W.M CONTROL
2	UPC1394C	P.W.M CONTROL
3	TL082CP	BUFF/COMPARATOR
4	NJM2903D	HOLD DOWN
5	UPC4558C	H.CENT/O.C.P
Q1	2SA1175	H.PULSE BUFFER
2	2SA979	H.LIN AMP
3	2SD774	H.LIN AMP
4	2SA1173	H.LIN AMP OUT
5	2SA473	H.LIN AMP OUT
6	2SC2688	P.W.M. DRIVE
7	2SC2542	P.W.M. OUT
8	2SC2551	O.C.P
9	2SA1175	O.C.P
10	2SC2688	H.DRIVE
11	2SD1399CA	H.OUT
12	2SD1134	H.CENT
13	2SB858	H.CENT
14	2SC2688	DC-D CONV.DRVIE
15	2SA1091	O.V.P
16	2SC2542	DC-DC CONV.
17	2SC2688	HV DRIVE
18	2SD1399	HV CONVERTER
19	2SA1175	HV Pulse
20	2SC2785	PROTECTOR
D1	RD12ES-B2	BIAS
3	1SS119	BIAS
4	1SS119	BIAS
5	RH-1A	H.DRIVE
6	RD7.SES-B2	PROTECTOR
7	RH-1A	PROTECTOR
8	ERD28-04S	PROTECTOR
9	RH-1A	H.P.RECT
10	RH-1A	H.P.RECT
12	V11N	G2 RECT
13	RH-1A	HV CONV
14	RH-1A	DC-DC CONV.
15	RH-1A	DC-DC CONV.
16	RH-1A	HV CONVERTER
17	RD12ES-B2	HV Pulse
19	1SS119	PROTECTOR
20	1SS119	PROTECTOR
24	IC UPC574J	REF. VOLTAGE
25	1SS119	HOLD DOWN
26	1SS119	HOLD DOWN
27	CR02AM-4	PROTECTOR
28	1SS119	PROTECTOR
29	IC UPC574J	REF. VOLTAGE
30	1SS119	PROTECTOR
31	RH-1A	+150V
32	RH-1A	H.DRIVE
33	RH-1A	HV CONVERTER
35	1SS119	PROTECTOR

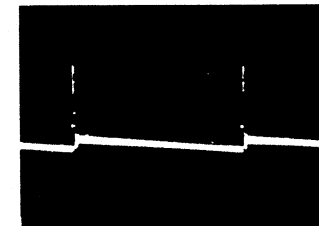
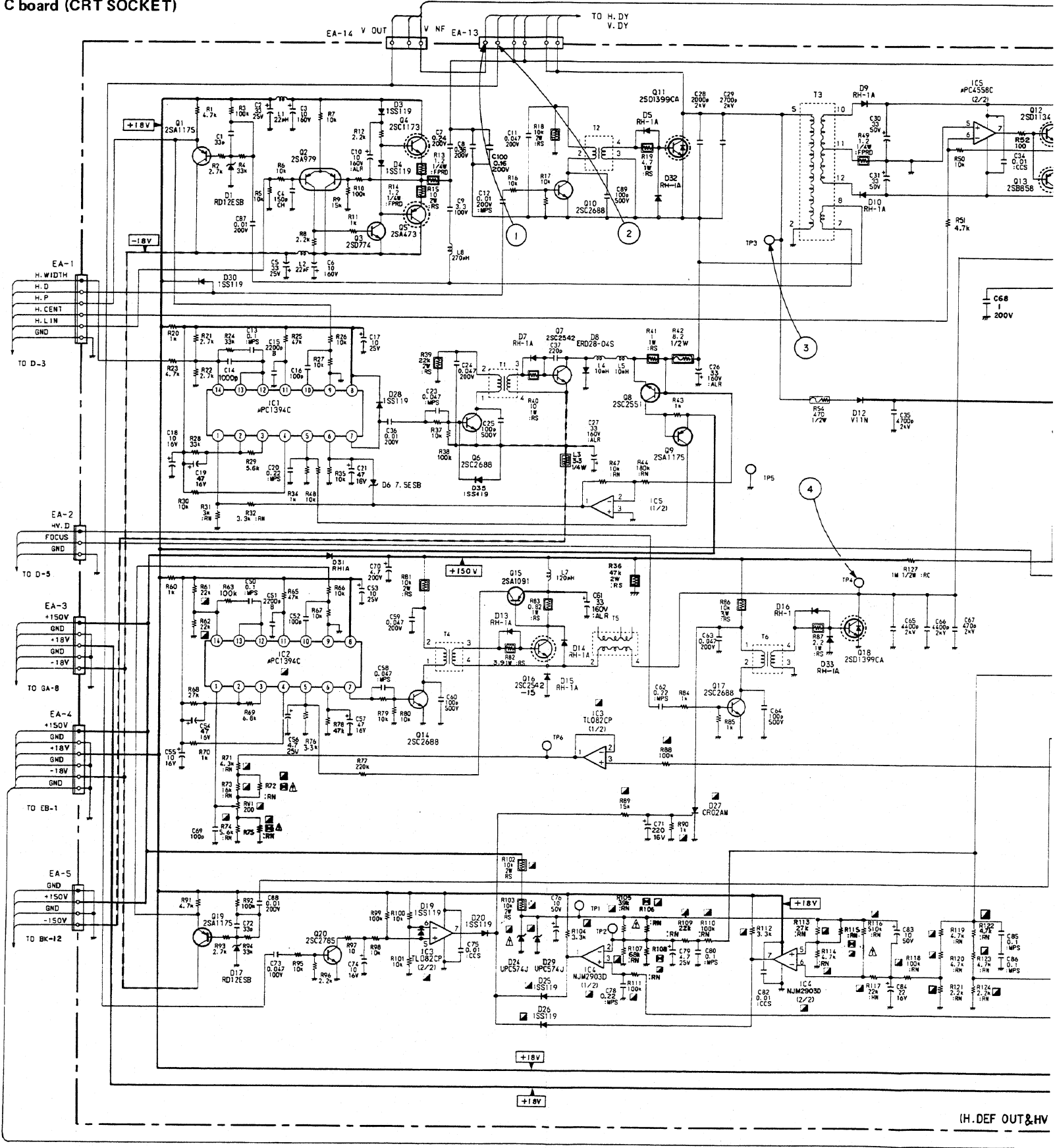
EB BOARD

Q1	2SA979	V.AMP
2	2SD774	V.AMP
3	2SA893A	V.AMP
4	2SC1890A	V.AMP
5	2SB860	V.AMP OUT
6	2SD1137	V.AMP OUT
7	2SB861	V.RETRACE SW
8	2SC2551	V.RETRACE SW
9	2SC2785	V.CONV
10	2SA1175	V.CONV
D1	GP08D	DC.STOPPER
2	GP08D	DC.STOPPER
3	1SS119	BIAS
4	1SS119	BIAS
5	1SS119	BIAS
6	1SS119	PROTECTOR

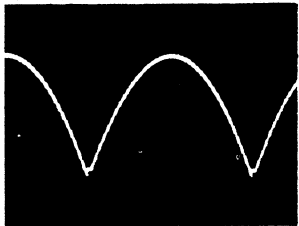
C BOARD

Q1	2SC3675	Y.CONV
2	2SC3675	G2 CONT
3	2SC2551	G2 CONT
4	2SC2785	G2 CONT
5	2SC2785	FOCUS
6	2SC2551	FOCUS
7	2SC3675	FOCUS
D1	1SS119	PROTECTION
2	1SS119	PROTECTION
3	1SS119	PROTECTION
4	1SS119	PROTECTION

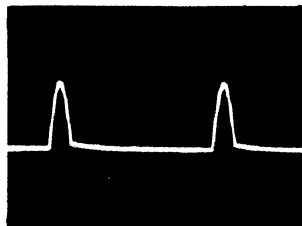
EA board (H OUT)  
EB board (V OUT)  
P board (FBT)  
C board (CRT SOCKET)



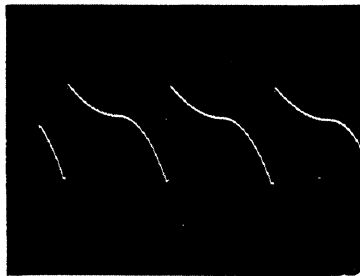
① 1100 Vp-p(V)



② 3.7 Vp-p(V)

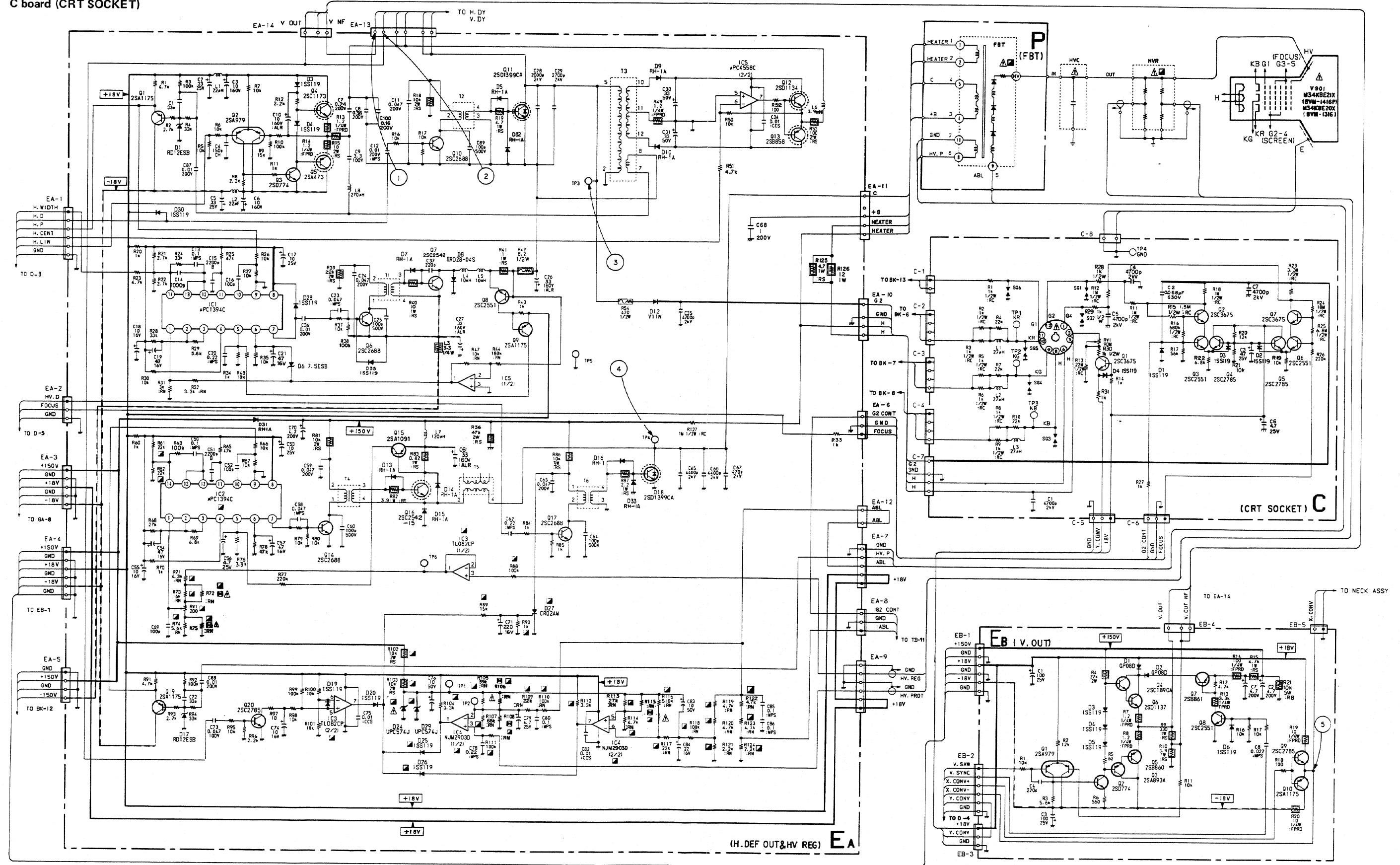


③ 1250 Vp-p(H)



④ 1100 Vp-p(H)

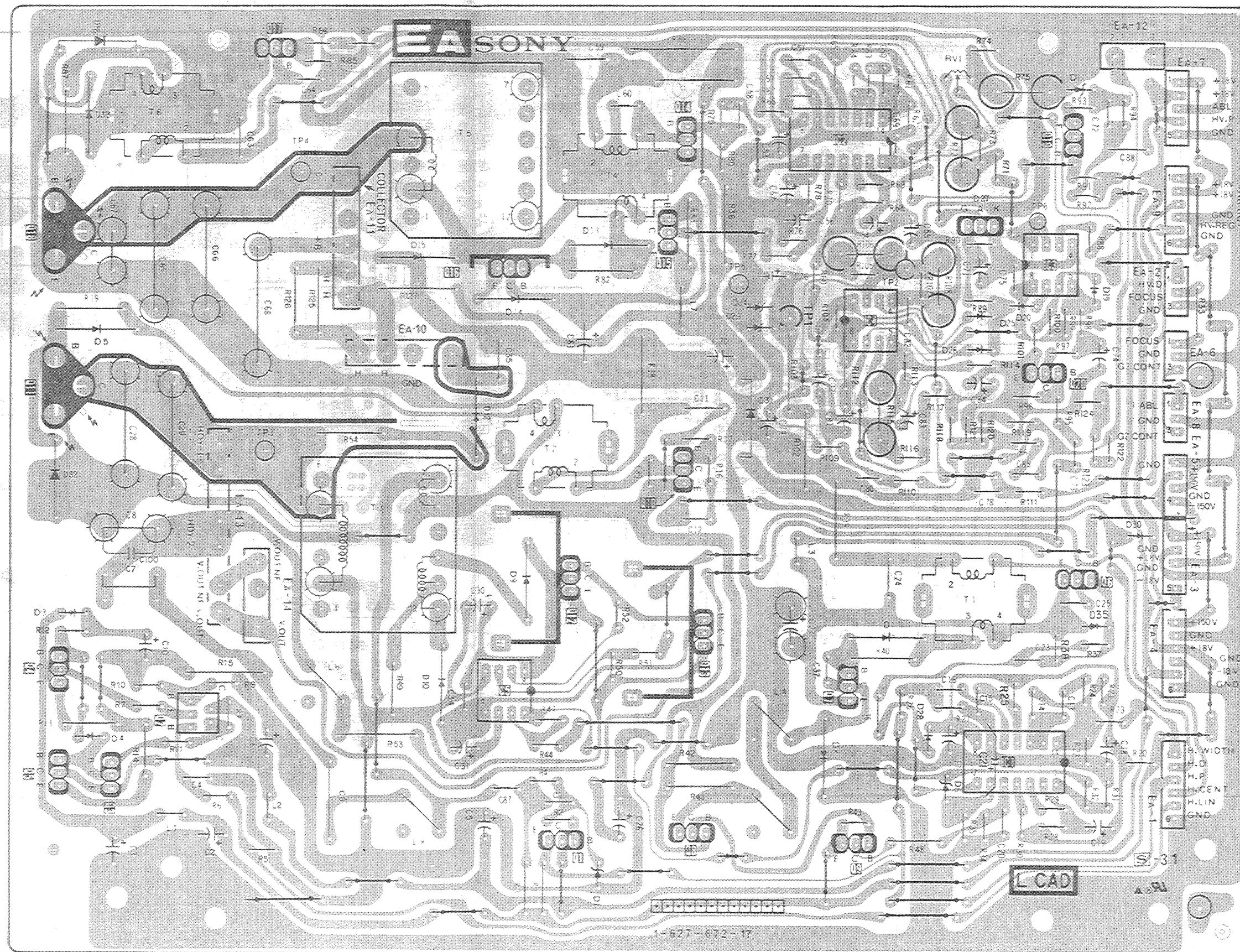
EA board (H OUT)  
EB board (V OUT)  
P board (FBT)  
C board (CRT SOCKET)



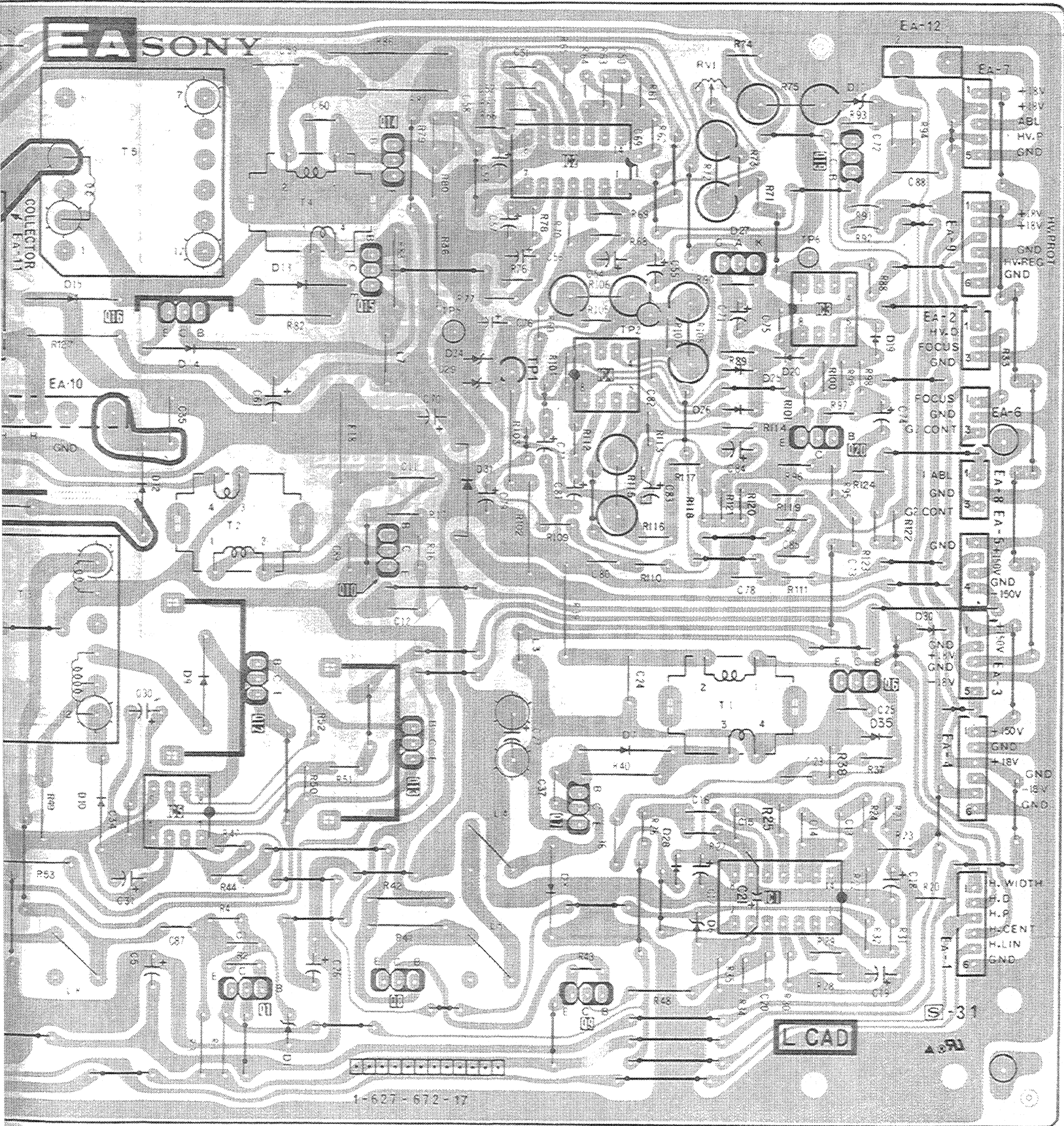


EA board (H OUT)

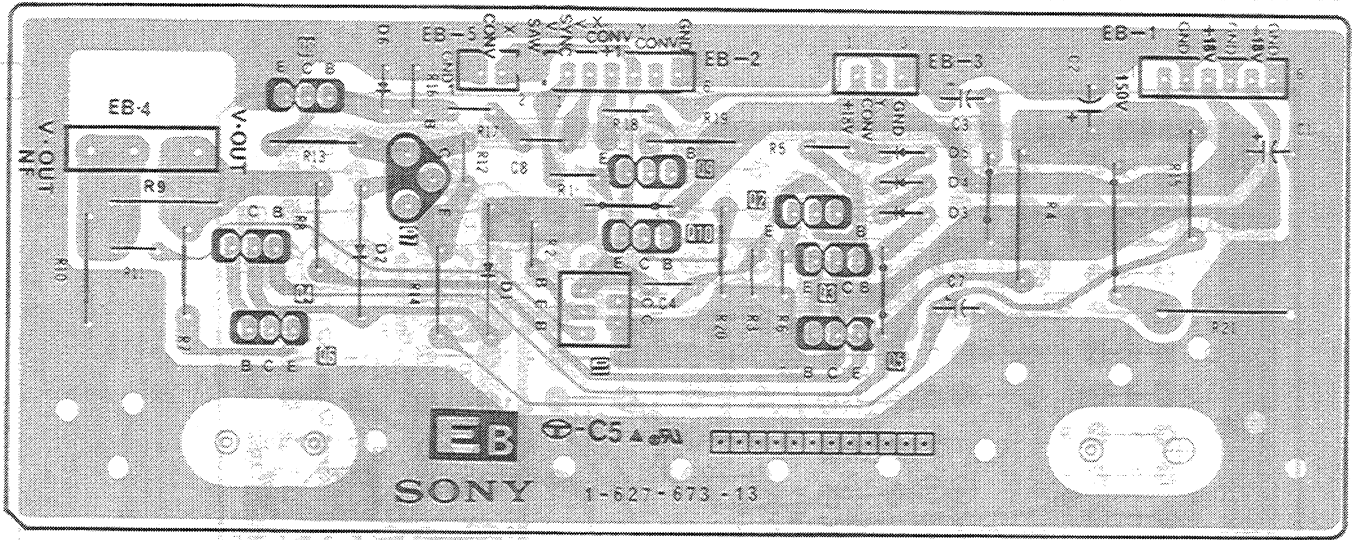
IC	Q	D	RV	TP
	17	16	I	
	14	33	17	
2	19		4	
		27	6	
18	15	13	5	
16		19	2	
4		14	I	
		20		
		24		
		25		
		29		
11	20	31	3	
		32		
	10	30		
		9		
	12	3	7	35
4	13	10		
5		28		
	2	8		
1		6		
	5			
	3			
	8			
	9			



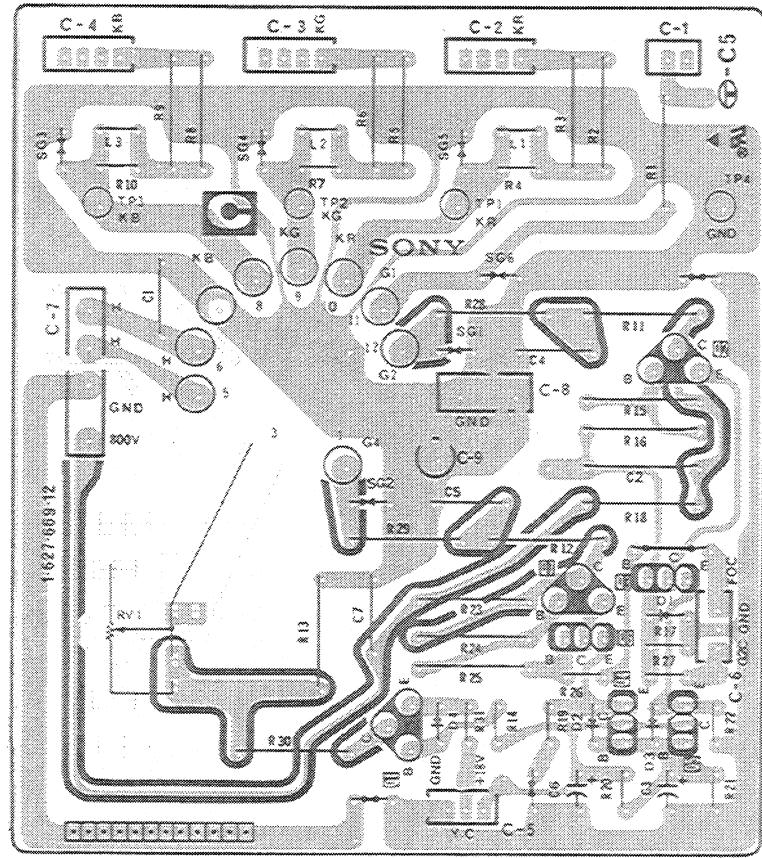




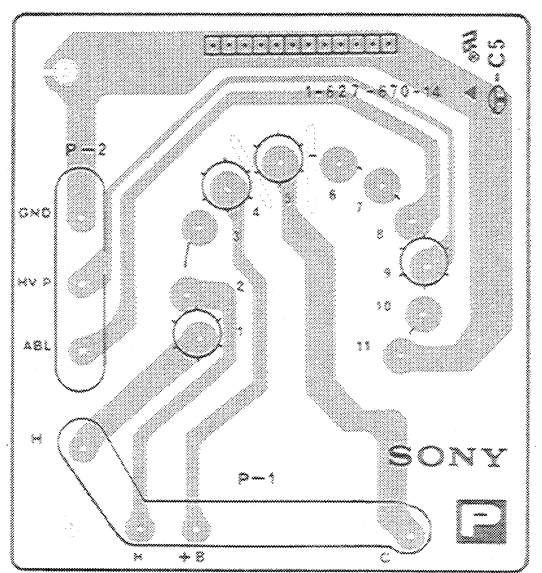
EB board (V OUT)



C board (CRT SOCKET)



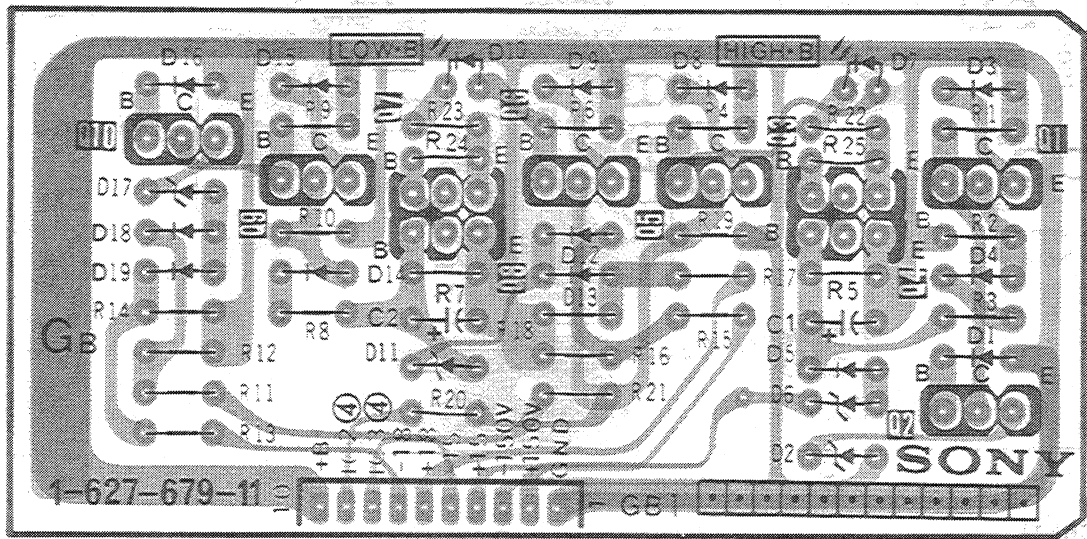
P board (FBT)



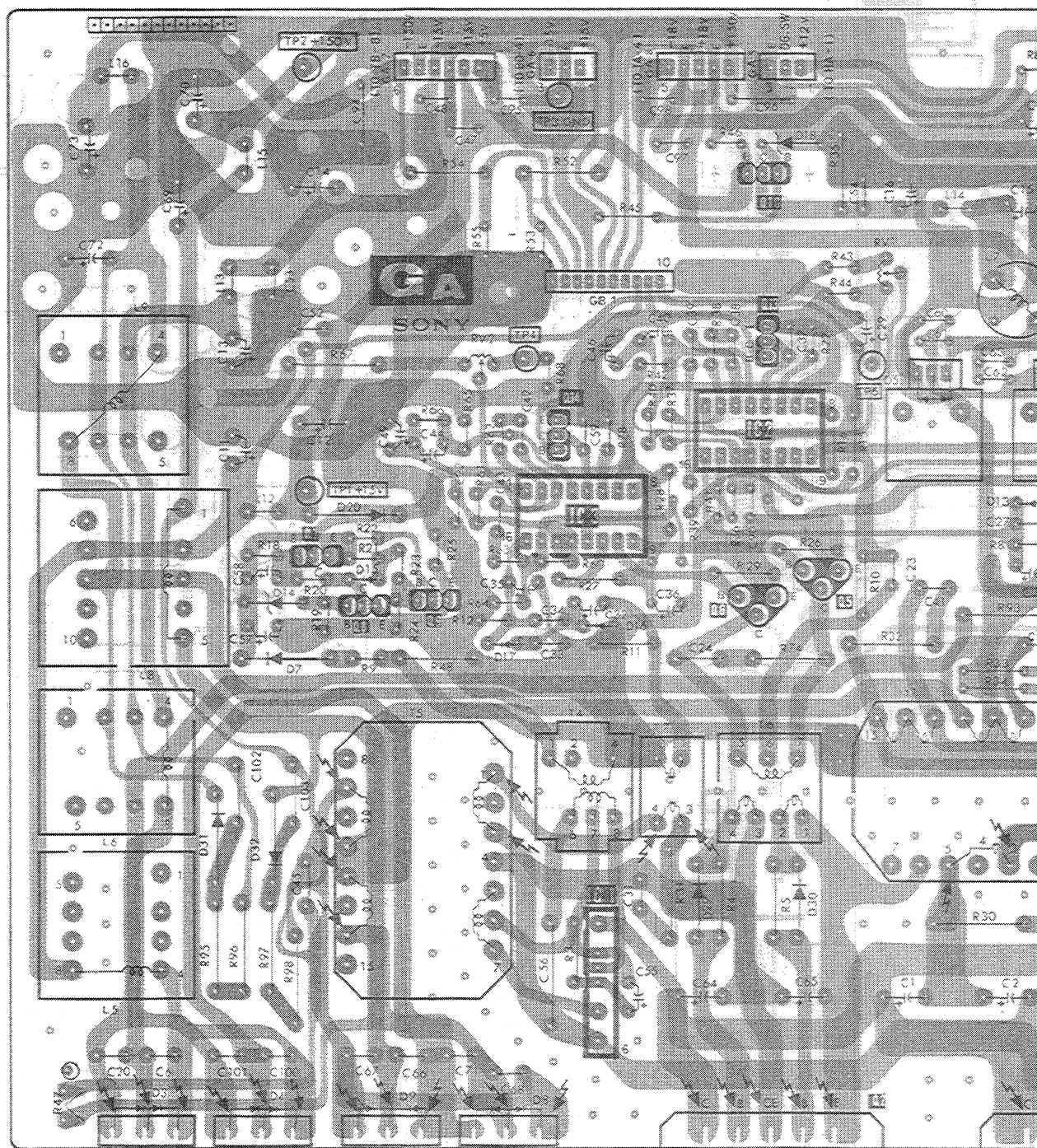


GB board (OVER VOLTAGE PROTECTOR)

GA board (AC RECT, DC REG)



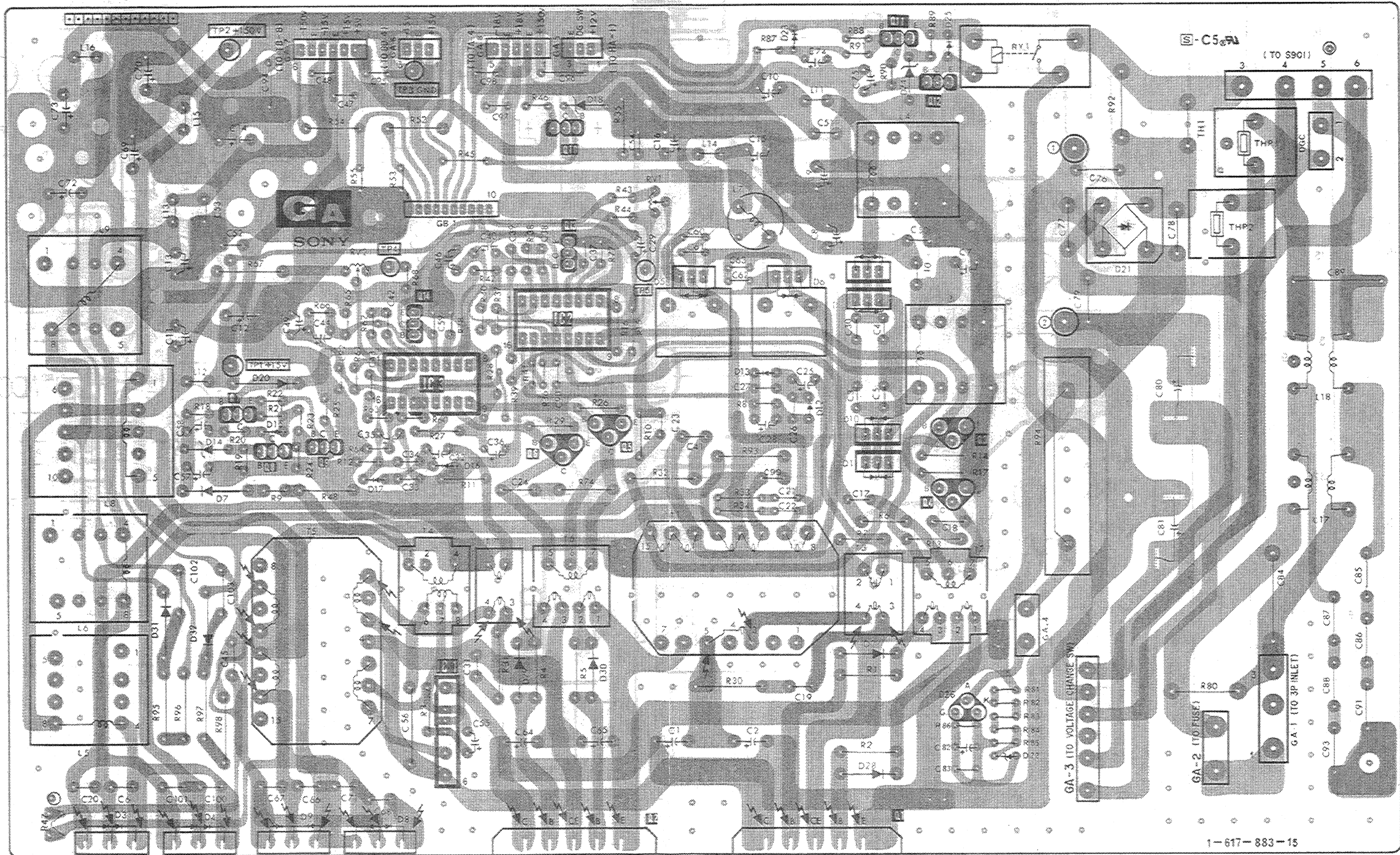
IC	Q	D	ADJ-TP
		23 25	TP2
	11		TP3
	12	18	
	10		
		21	RV1
	13	11	RV2 TP4
		5 6	TP5
		2	
2	14		
3		20	TP1
	7	12	
	5	15	
	6	10	
	8	14	
		16	
		17	
		7	
		31, 32	
		29	
		27	
		30	
		26	
		22	
		28	
		3	
		4	
		9	
		8	





A board (AC RECT, DC REG)

IC	Q	D	ADJ-TP
		23 25	TP2
	11		TP3
	12	24	
		18	
	10		RV1
		21	
	13	11	RV2 TP4
		5 6	TP5
2	14	2	
3			TP1
		20 13	
	7	12	
	5	15	
	9 6 3	10	
	8	14	
		16 1	
		17	
		7	
		31,32	
		29 27	
		30	
		26	
1		22	
		28	
	2 1	3 4	
		9 8	



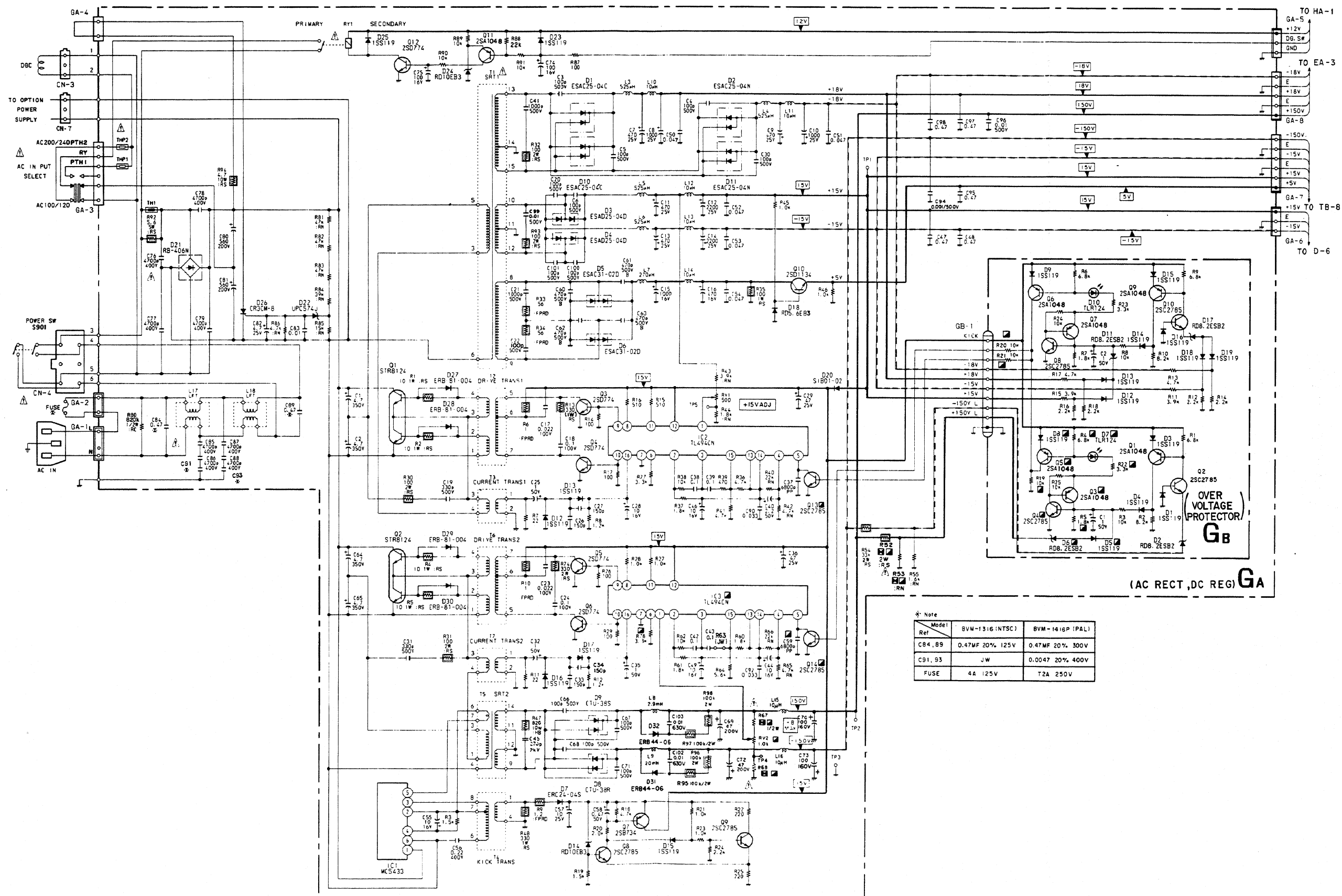
1-617-883-15

- : Pattern from the side which enables seeing.
- : Pattern of the rear side.

GA, GB	GA, GB
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**GA board (AC RECT, DC REG)**

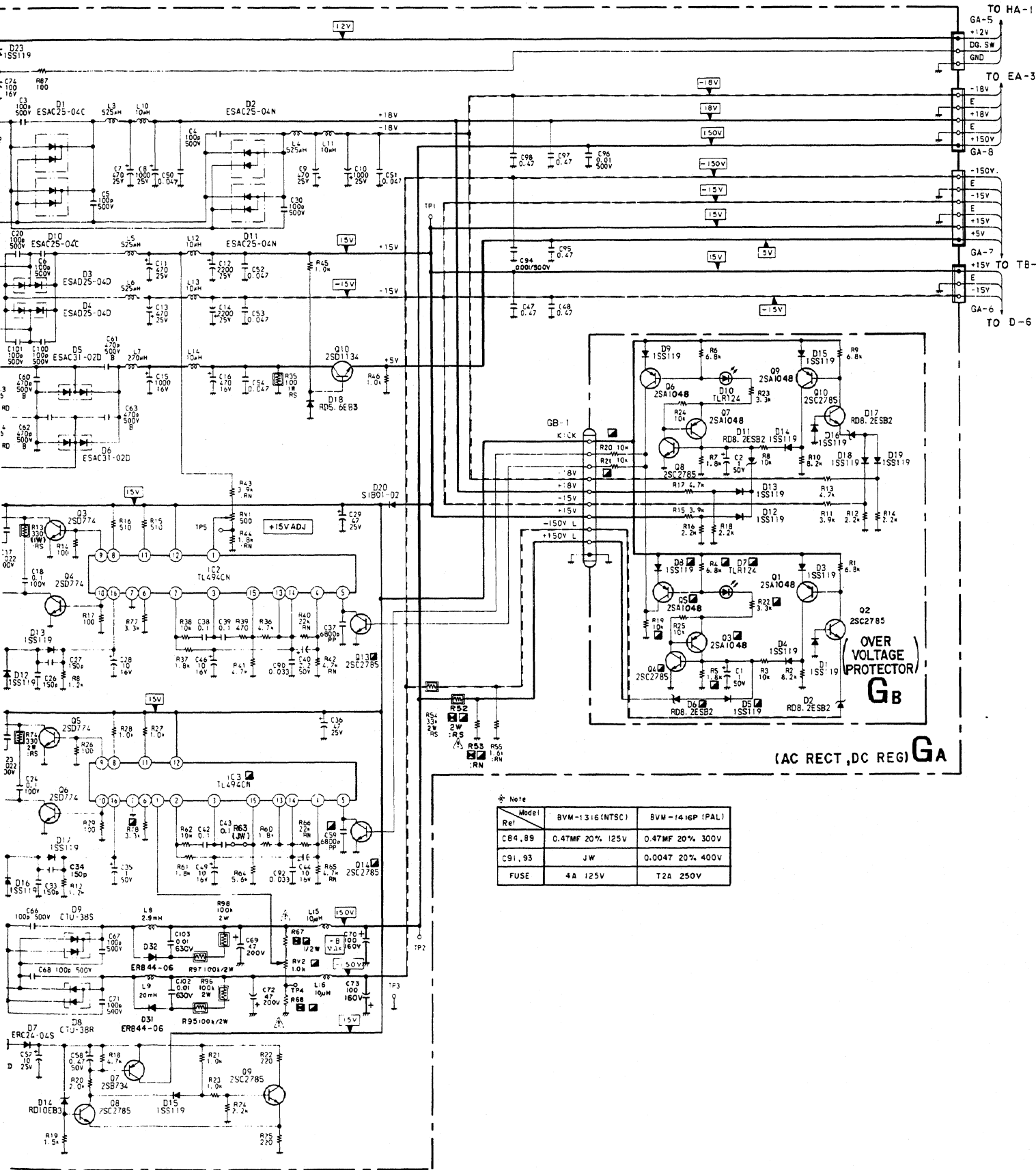
**GB board (OVER VOLTAGE PROTECTOR)**



Model	BVM-1316 (NTSC)	BVM-1416P (PAL)
Ref		
C84, 89	0.47MF 20%, 125V	0.47MF 20%, 300V
C91, 93	JW	0.0047 20%, 400V
FUSE	4A 125V	T2A 250V

GA B

IC	
Q1	2
	3
	4
	5
	6
	7
	8
	9
	1
	1
	1
	1
D1	2
	3
	4
	5
	6
	7
	8
	9
	1
	1
	1
	1
	1
	1
	1
	2
	2
	2
	2
	2
	2
	2
	2
	2
	3
	3
	3
	3



Note

Ref	Model	BVM-1316 (NTSC)	BVM-1416P (PAL)
C84, 89	0.47MF 20% 125V	0.47MF 20% 300V	
C91, 93	JW	0.0047 20% 400V	
FUSE	4A 125V	T2A 250V	

GA BOARD

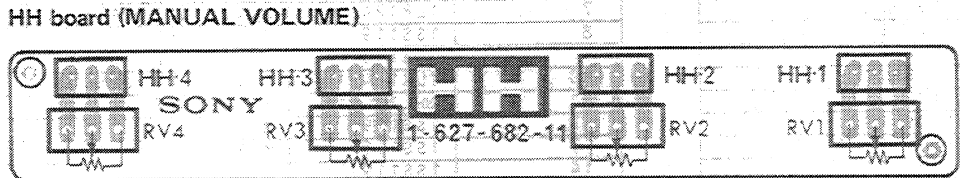
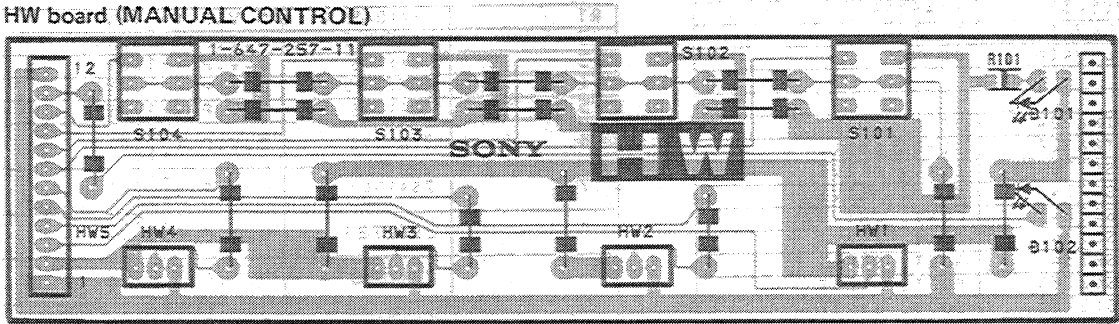
IC1	MC5433	STARTER
2	TL494CN	DC REG
3	TL494CN	DC REG
Q1	STR8124	DC-DC CONV.
2	STR8124	DC-DC CONV.
3	2SD774	CONV. DRIVE
4	2SD774	CONV. DRIVE
5	2SD774	CONV. DRIVE
6	2SD774	CONV. DRIVE
7	2SB734	SOFT. START
8	2SC2785	SOFT. START
9	2SC2785	SOFT. START
10	2SD1134	+5V REG.
11	2SA1048	D.G. CONTROL
12	2SD774	D.G. CONTROL
13	2SC2785	O.V.P SW
14	2SC2785	O.V.P SW
D1	ESAC25-04C	+18V RECT
2	ESAC25-04N	-18V RECT
3	ESAD25-04D	+15V RECT
4	ESAD25-04D	-15V RECT
5	ESAC31-02D	+5V RECT
6	ESAC31-02D	-5V RECT
7	ERC24-045	START. RECT
8	CTU-38R	-150V RECT
9	CTU-38S	+150V RECT
10	ESAC25-04C	+18V RECT
11	ESAC25-04N	-18V RECT
12	1SS119	O.C.P RECT
13	1SS119	O.C.P RECT
14	RD10EB3T	STARTER
15	1SS119	STARTER
16	1SS119	O.C.P RECT
17	1SS119	O.C.P RECT
18	RD5.6E-B3TN	+5V REG
19	1SS119	
20	SIB01-02	DC. STOPPER
21	RB406N	AC RECT
22	uPC574J	O.V.P
23	1SS119	DISCHARGE
24	RD10EB3T	+10V REG
25	1SS119	SW PROTECT
26	CR3CM-8	O.V.P
27	ERB81-004	CONV. DRIVE
28	ERB81-004	CONV. DRIVE
29	ERB81-004	CONV. DRIVE
30	ERB81-004	CONV. DRIVE
31	ERB44-06	
32	ERB44-06	

GB BOARD

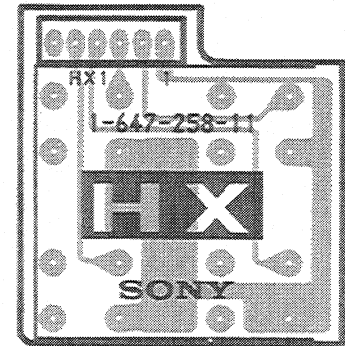
Q1	2SA1048	O.V.P (-150V)
2	2SC2785	O.V.P (-150V)
3	2SA1048	O.V.P (+150V)
4	2SC2785	O.V.P (+150V)
5	2SA1048	O.V.P (+150V)
6	2SA1048	O.V.P (+15V)
7	2SA1048	O.V.P (+15V)
8	2SC2785	O.V.P (+15V)
9	2SA1048	O.V.P (-15V)
10	2SC2785	O.V.P (-15V)
D1	1SS119	PROTECTOR
2	RD8.2ES-T1B2	REFERENCE
3	1SS119	PROTECTOR
4	1SS119	MIX.
5	1SS119	MIX.
6	RD8.2ES-T1B2	REFERENCE
7	TLRT24	O.V.P INDICATE
8	1SS119	PROTECTOR
9	1SS119	PROTECTOR
10	TLRT24	O.V.P INDICATE
11	RD8.2ES-T1B2	REFERENCE
12	1SS119	MIX.
13	1SS119	MIX.
14	1SS119	MIX.
15	1SS119	PROTECTOR
16	1SS119	PROTECTOR
17	RD8.2ES-T1B2	REFERENCE
18	1SS119	MIX.
19	1SS119	MIX.



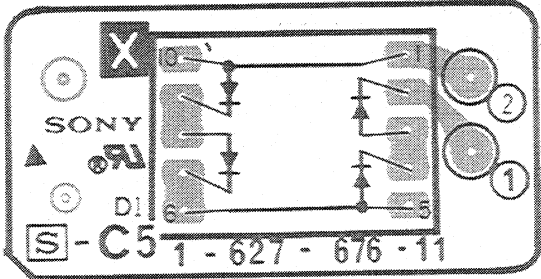
HA board (PANEL CONTROL), HH board (MANUAL VOLUME), HW board (MANUAL CONTROL),  
HX board (INPUT SELECT), HY board (CONTROL FUNCTION SELECT), X board (TALLY), Y board (POWER LED)



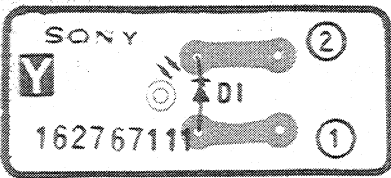
HX board (INPUT SELECT)



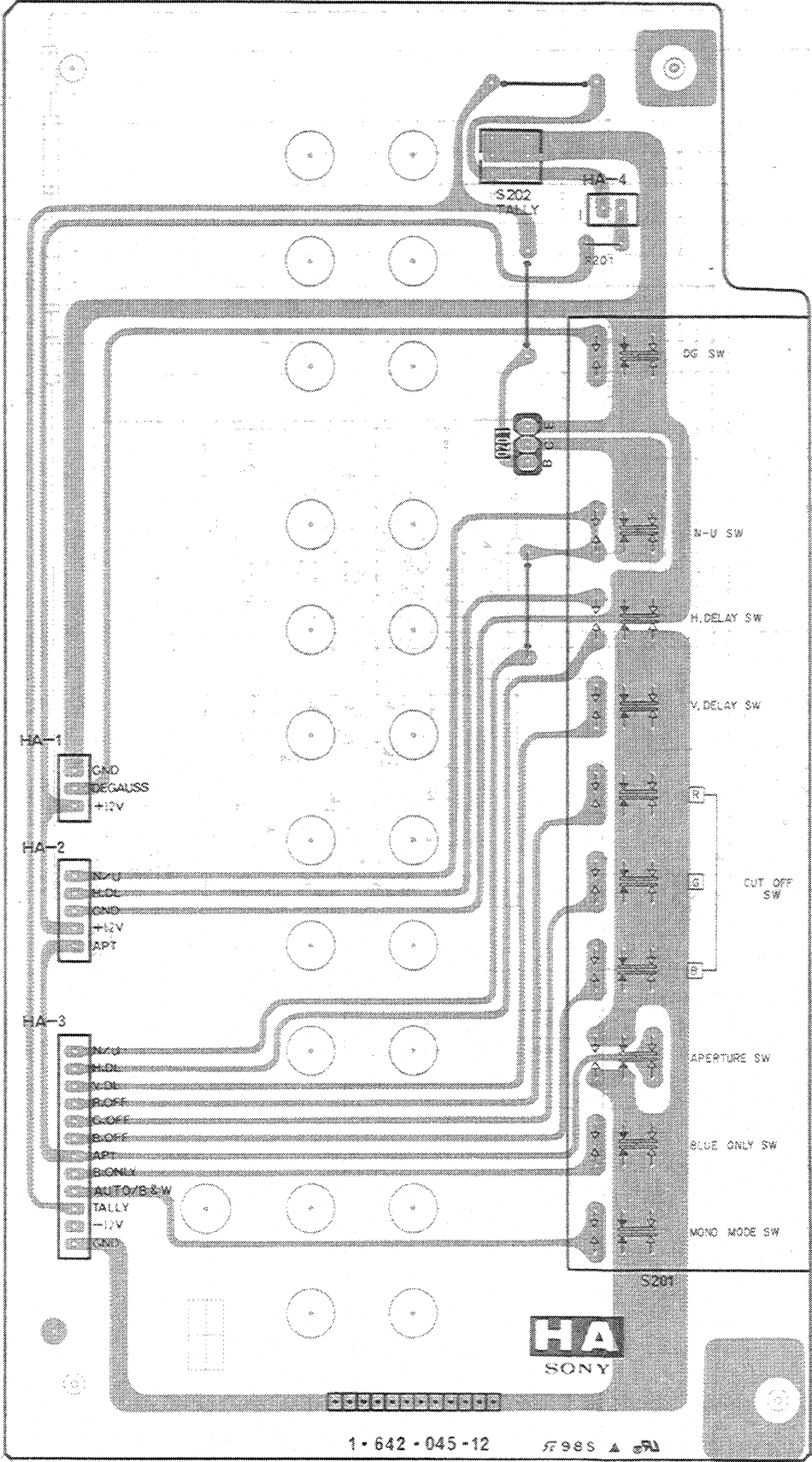
X board (TALLY)



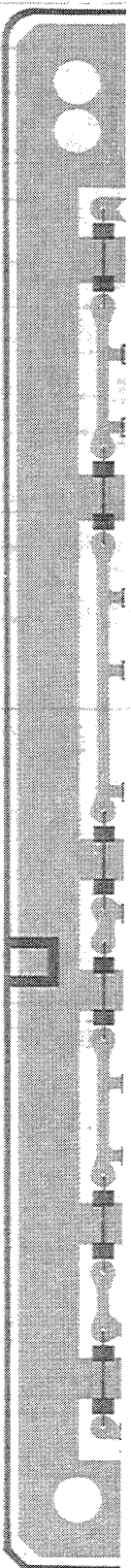
Y board (POWER LED)



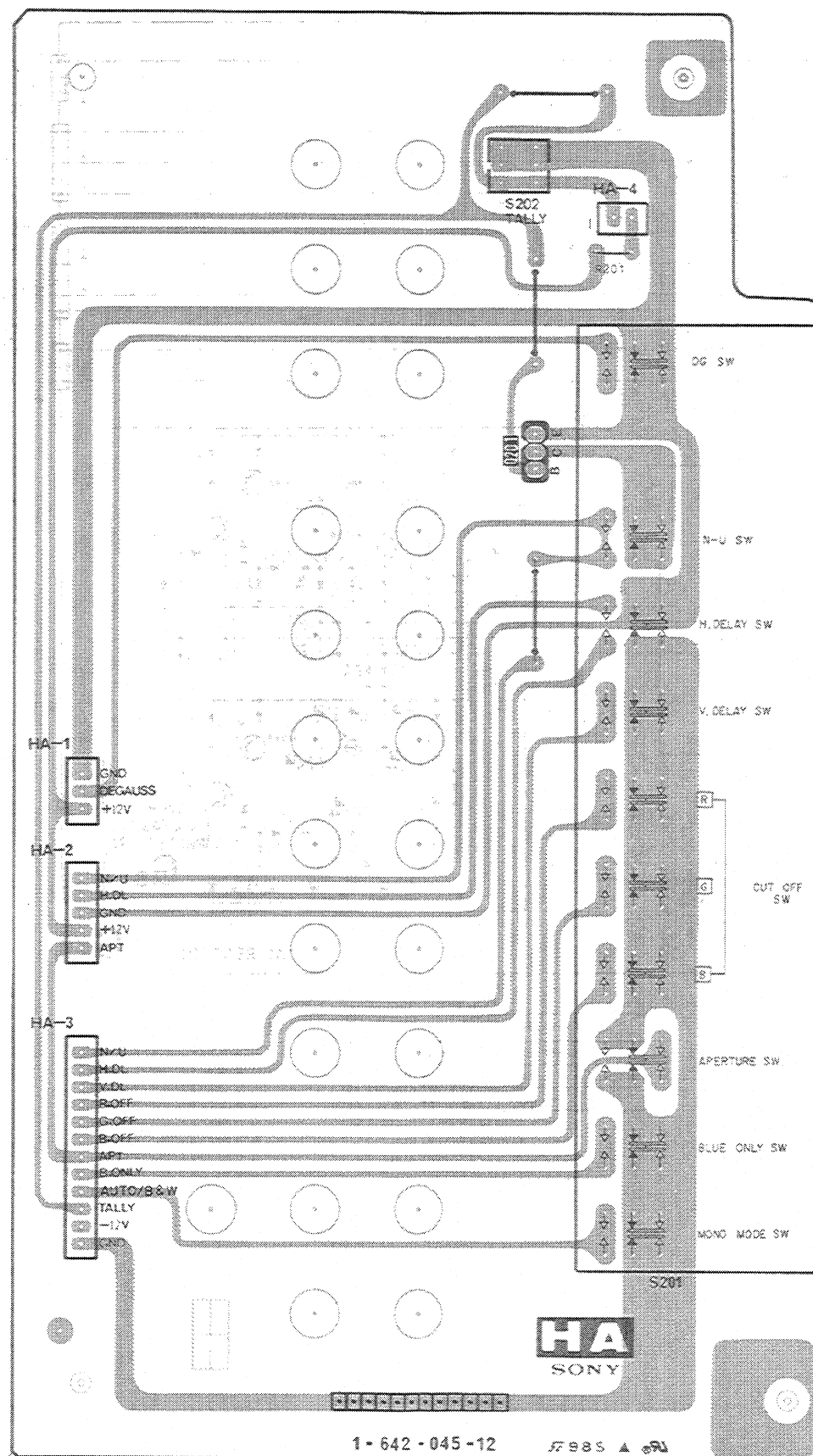
HA board (PANEL CONTROL)



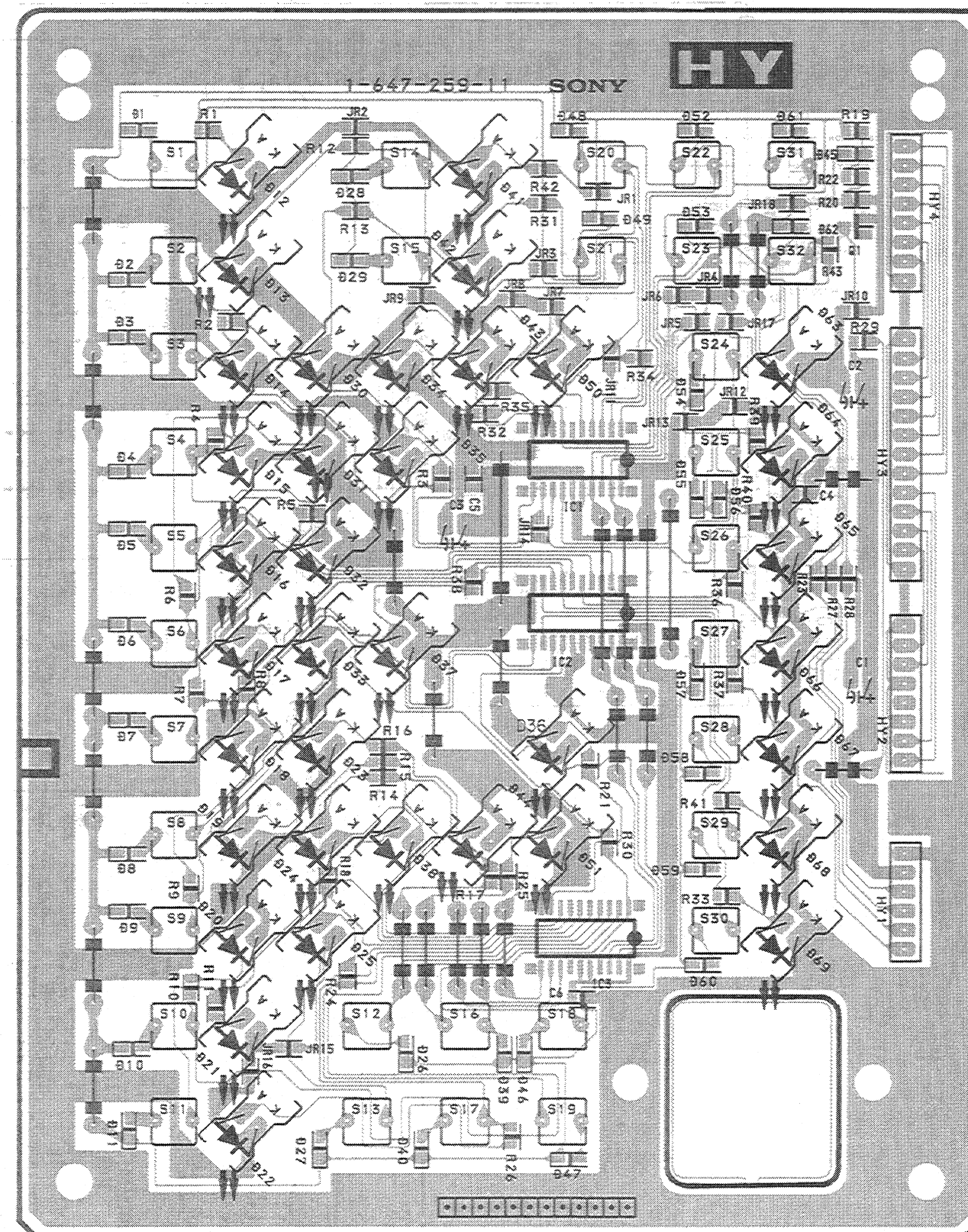
HY board (CONTROL FUNCTION SELECT)



HA board (PANEL CONTROL)



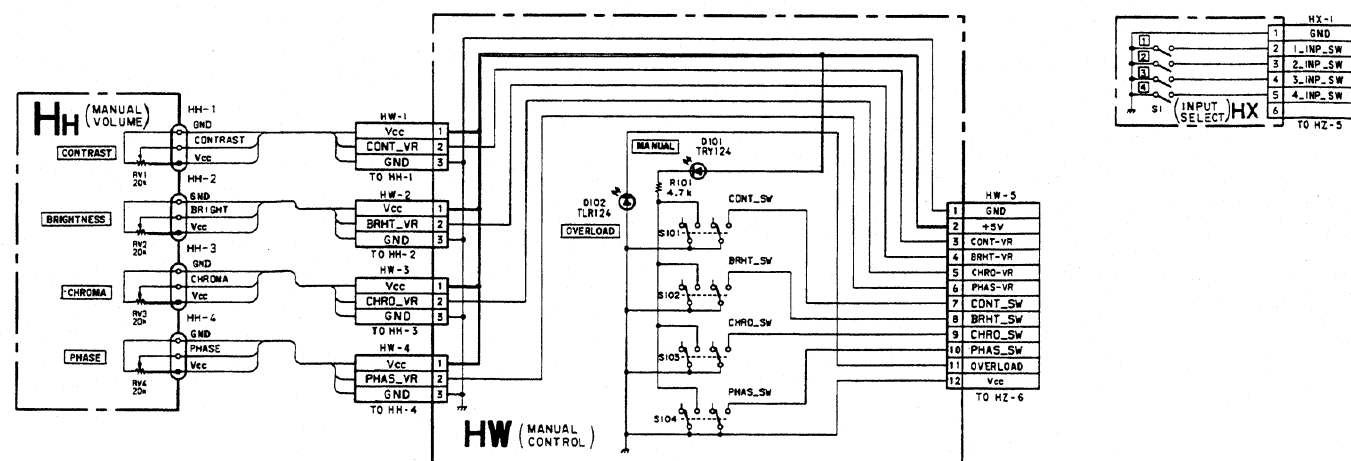
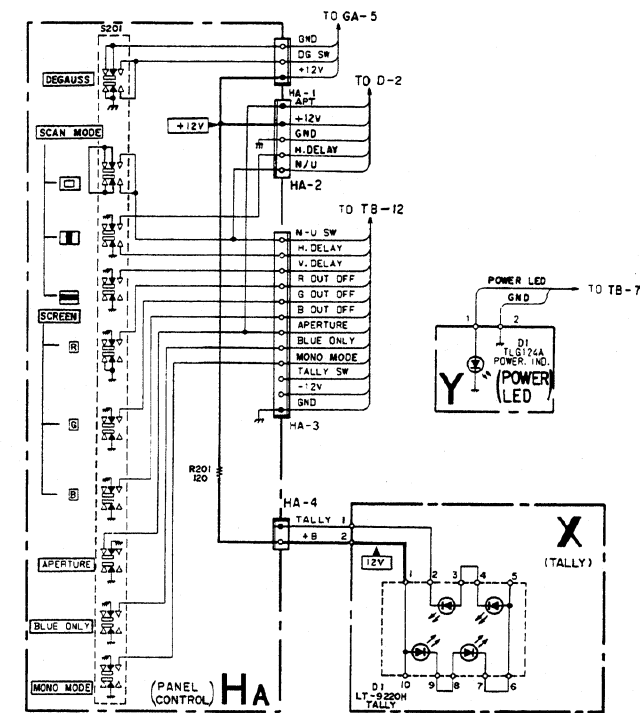
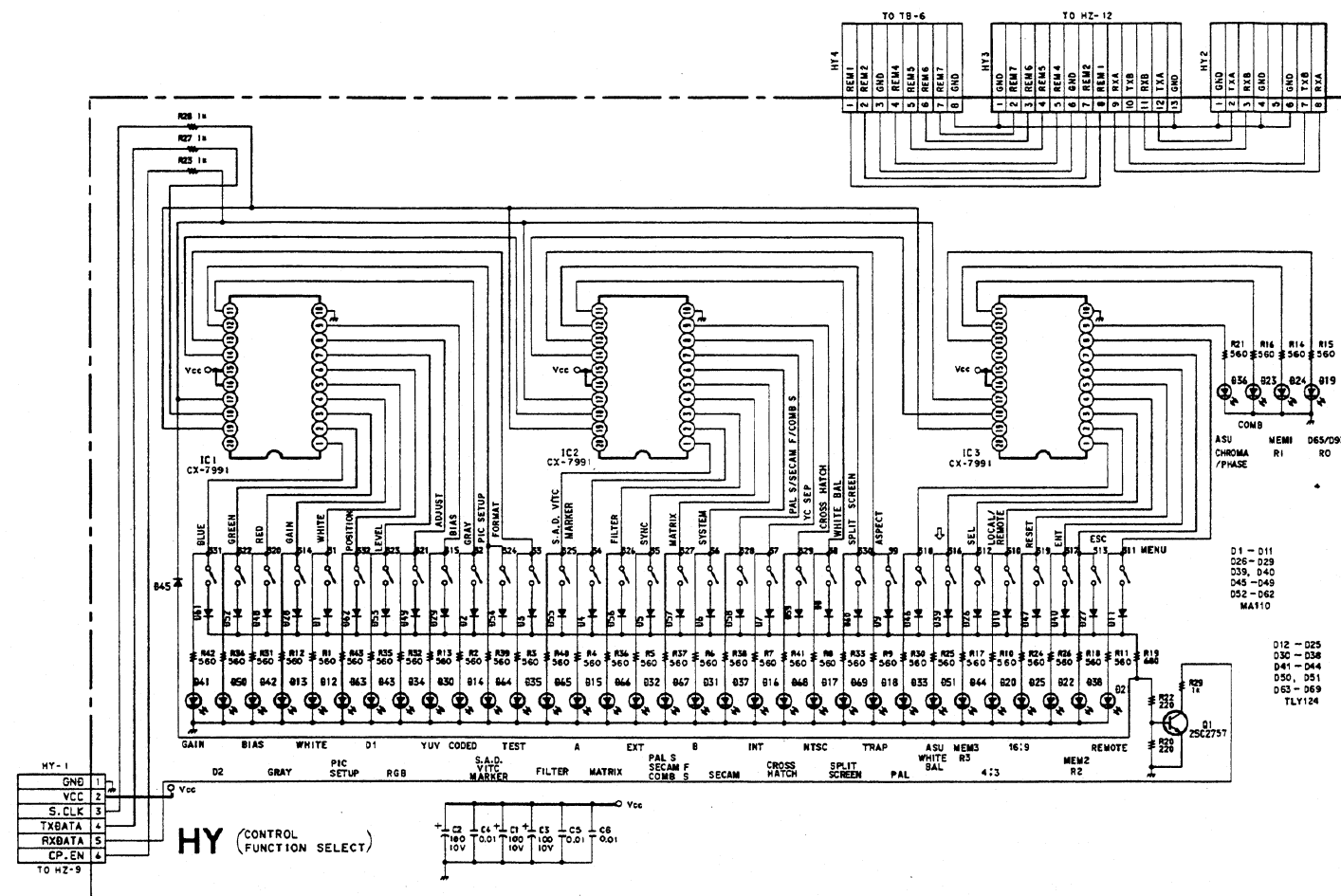
HY board (CONTROL FUNCTION SELECT)





HA, HH, HW, HX, HY, X, Y	HA, HH, HW, HX, HY, X, Y
--------------------------	--------------------------

HA board (PANEL CONTROL), HH board (MANUAL VOLUME), HW board (MANUAL CONTROL),  
HX board (INPUT SELECT), HY board (CONTROL FUNCTION SELECT), X board (TALLY), Y board (POWER LED)



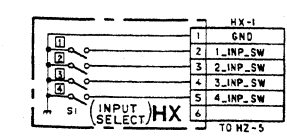
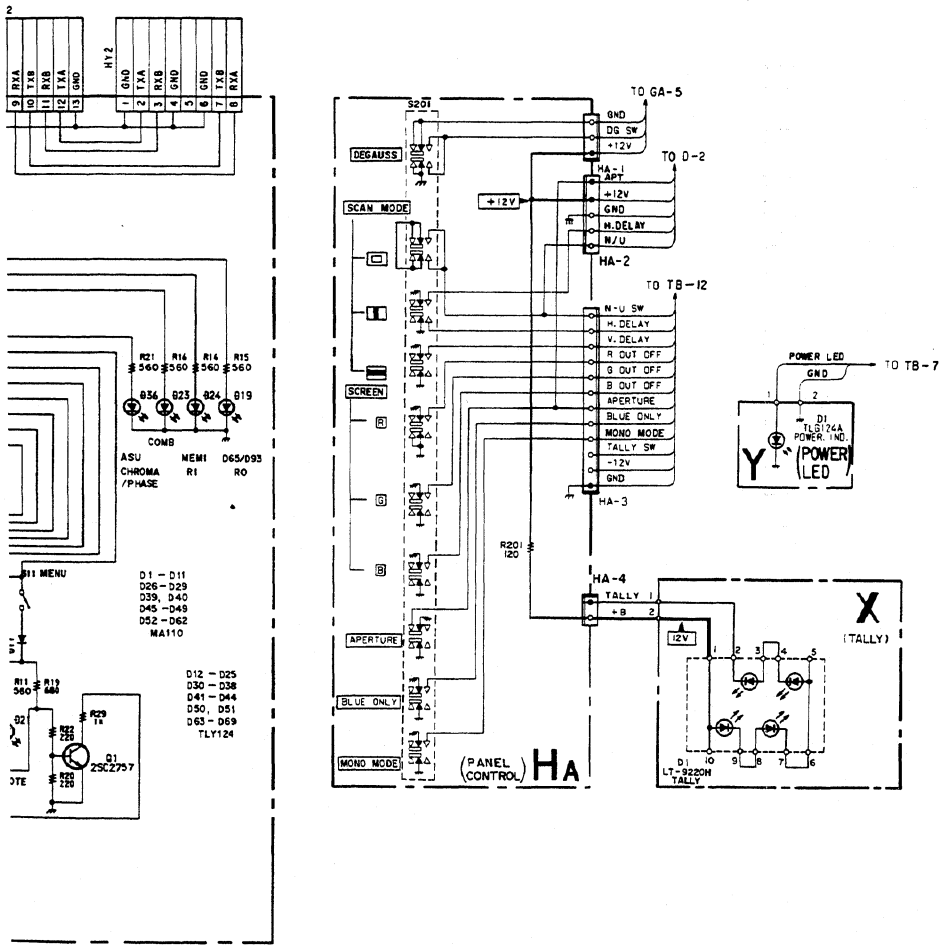
HW BOARD

D101	TLR124	INDICATOR
102	TLR124	INDICATOR

Y, X, Y HA, HH, HW, HX, HY, X, Y

HA, HH, HW, HX, HY, X, Y

VER LED)



Y BOARD

D1	TLG124A	POWER INDICATOR
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X BOARD

D1	LT-9220H	TALLY LAMP
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HY BOARD

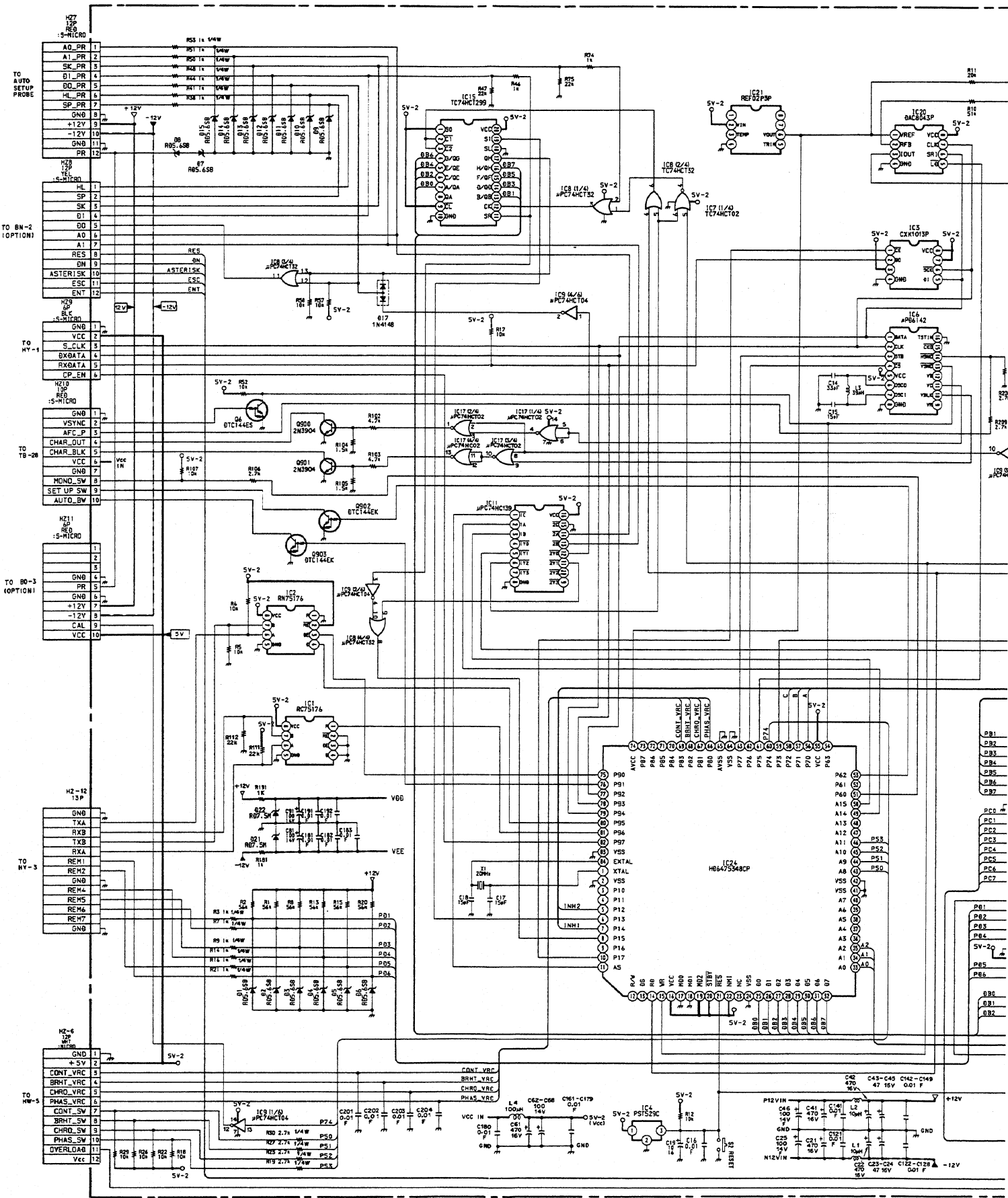
IC 1	CX-7991	KEY SCAN	D 35	TLY124	INDICATOR
2	CX-7991	KEY SCAN	36	TLY124	INDICATOR
3	CX-7991	KEY SCAN	37	TLY124	INDICATOR
			38	TLY124	INDICATOR
0 1	2SC2757	KEY DETECTION	39	MA110	PROTECTION
			40	MA110	PROTECTION
D 1	MA110	PROTECTION	41	TLY124	INDICATOR
2	MA110	PROTECTION	42	TLY124	INDICATOR
3	MA110	PROTECTION	43	TLY124	INDICATOR
4	MA110	PROTECTION	44	TLY124	INDICATOR
5	MA110	PROTECTION	45	MA110	PROTECTION
6	MA110	PROTECTION	46	MA110	PROTECTION
7	MA110	PROTECTION	47	MA110	PROTECTION
8	MA110	PROTECTION	48	MA110	PROTECTION
9	MA110	PROTECTION	49	MA110	PROTECTION
10	MA110	PROTECTION	50	TLY124	INDICATOR
11	MA110	PROTECTION	51	TLY124	INDICATOR
12	MA110	PROTECTION	52	MA110	PROTECTION
13	TLY124	INDICATOR	53	MA110	PROTECTION
14	TLY124	INDICATOR	54	MA110	PROTECTION
15	TLY124	INDICATOR	55	MA110	PROTECTION
16	TLY124	INDICATOR	56	MA110	PROTECTION
17	TLY124	INDICATOR	57	MA110	PROTECTION
18	TLY124	INDICATOR	58	MA110	PROTECTION
19	TLY124	INDICATOR	59	MA110	PROTECTION
20	TLY124	INDICATOR	60	MA110	PROTECTION
21	TLY124	INDICATOR	61	MA110	PROTECTION
22	TLY124	INDICATOR	62	MA110	PROTECTION
23	TLY124	INDICATOR	63	MA110	PROTECTION
24	TLY124	INDICATOR	64	TLY124	INDICATOR
25	TLY124	INDICATOR	65	TLY124	INDICATOR
26	MA110	PROTECTION	66	TLY124	INDICATOR
27	MA110	PROTECTION	67	TLY124	INDICATOR
28	MA110	PROTECTION	68	TLY124	INDICATOR
29	MA110	PROTECTION	69	TLY124	INDICATOR
30	TLY124	INDICATOR			
31	TLY124	INDICATOR			
32	TLY124	INDICATOR			
33	TLY124	INDICATOR			
34	TLY124	INDICATOR			

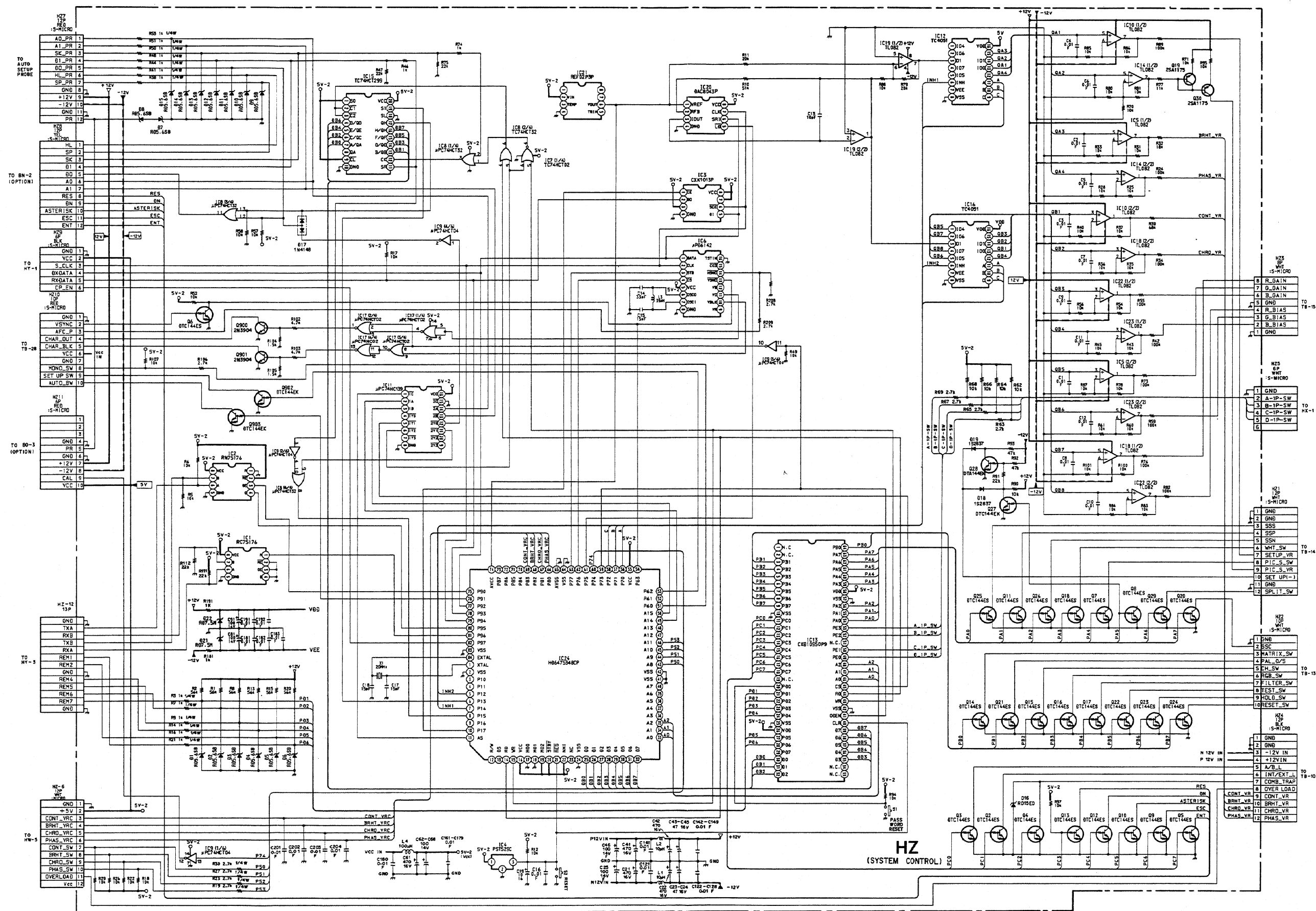
5. DIAGRAMS

HZ board (SYSTEM CONTROL)

HZ BOARD

IC 1	SN75176BP	RECEIVER
2	SN75176BP	TRANSMITTER
3	X25040	NV RAM
4	PST529C	RESET
5	TL082M	OP AMP
6	UPD6142G-101	ON SCREEN D
7	TC74HCT02AF	NOR GATE
8	TC74HCT32AF	OR GATE
9	TC74HCT04AF	INVERTOR
10	TL082M	SAMPLE HOLD
11	TC74HCT139AF	DECODER
12	MC14051BF	DE-MULTIPLEXER
13	CXD10950	I/O EXPANDER
14	TL082M	SAMPLE HOLD
15	TC74HC299AF	SHIFT REGISTER
16	MC14051BF	DE-MULTIPLEXER
17	TC74HCT02AF	NOR GATE
18	TL082M	SAMPLE HOLD
19	TL082M	SAMPLE HOLD
20	DAC8043GP	D/A CONNECTOR
21	REF02EZ	REF. VOLTAGE
22	TL082M	SAMPLE HOLD
23	TL082M	SAMPLE HOLD
24	HD6475368CP-BVM	CPU
Q 2	DTC144EK	OUTPUT BUFFER
3	DTC144EK	OUTPUT BUFFER
4	DTC144EK	OUTPUT BUFFER
5	DTC144EK	OUTPUT BUFFER
6	DTC144EK	BUFFER
7	DTC144EK	OUTPUT BUFFER
8	DTC144EK	OUTPUT BUFFER
9	DTC144EK	OUTPUT BUFFER
10	DTC144EK	OUTPUT BUFFER
11	DTC144EK	OUTPUT BUFFER
12	DTC144EK	OUTPUT BUFFER
13	DTC144EK	OUTPUT BUFFER
14	DTC144EK	OUTPUT BUFFER
15	DTC144EK	OUTPUT BUFFER
16	DTC144EK	OUTPUT BUFFER
17	DTC144EK	OUTPUT BUFFER
18	DTC144EK	OUTPUT BUFFER
19	2SA1226	OUTPUT BUFFER
20	DTC144EK	OUTPUT BUFFER
21	DTC144EK	OUTPUT BUFFER
22	DTC144EK	OUTPUT BUFFER
23	DTC144EK	OUTPUT BUFFER
24	DTC144EK	OUTPUT BUFFER
25	DTC144EK	OUTPUT BUFFER
26	DTC144EK	OUTPUT BUFFER
27	DTC144EK	OUTPUT BUFFER
28	DTC144EK	OUTPUT BUFFER
29	DTC144EK	OUTPUT BUFFER
30	2SA1226	OUTPUT BUFFER
900	2SC1623	OUTPUT BUFFER
901	2SC1623	OUTPUT BUFFER
902	DTC144EK	OUTPUT BUFFER
903	DTC144EK	OUTPUT BUFFER
D 1	RD5.6ES-T1B	PROTECTION
2	RD5.6ES-T1B	PROTECTION
3	RD5.6ES-T1B	PROTECTION
4	RD5.6ES-T1B	PROTECTION
5	RD5.6ES-T1B	PROTECTION
6	RD5.6ES-T1B	PROTECTION
7	RD5.6ES-T1B	PROTECTION
8	RD5.6ES-T1B	PROTECTION
9	RD5.6ES-T1B	PROTECTION
10	RD5.6ES-T1B	PROTECTION
11	RD5.6ES-T1B	PROTECTION
12	RD5.6ES-T1B	PROTECTION
13	RD5.6ES-T1B	PROTECTION
14	RD5.6ES-T1B	PROTECTION
15	RD5.6ES-T1B	PROTECTION
17	1S2835	SWITCH
18	1S2837	SWITCH
19	1S2837	SWITCH
21	RD7.5M-T1B2	-7.5V REG
22	RD7.5M-T1B2	+7.5V REG



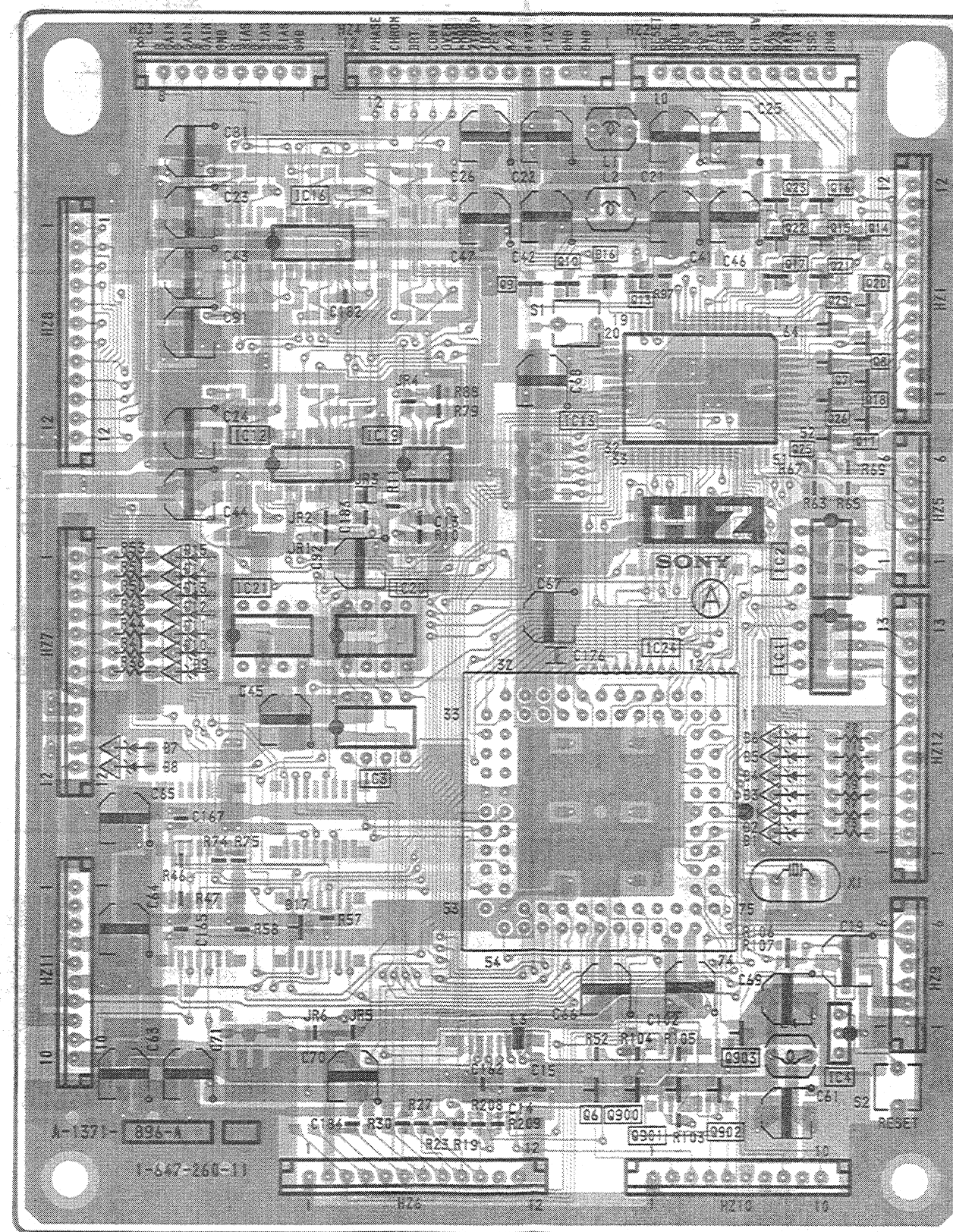




# HZ board (SYSTEM CONTROL)

— CONDUCTOR SIDE —

IC	Q	D
16	23 16 22 15 14 9 10 13 17 21 20 29 8 7 18 26 11 25	16
13		15 14 13 12 11 10 9
12 19		7 8
2 1		6 5 4 3 2 1
21 20		17
3		903
24		6 900 901 902
4		



5-83

— COMPONENT SIDE —

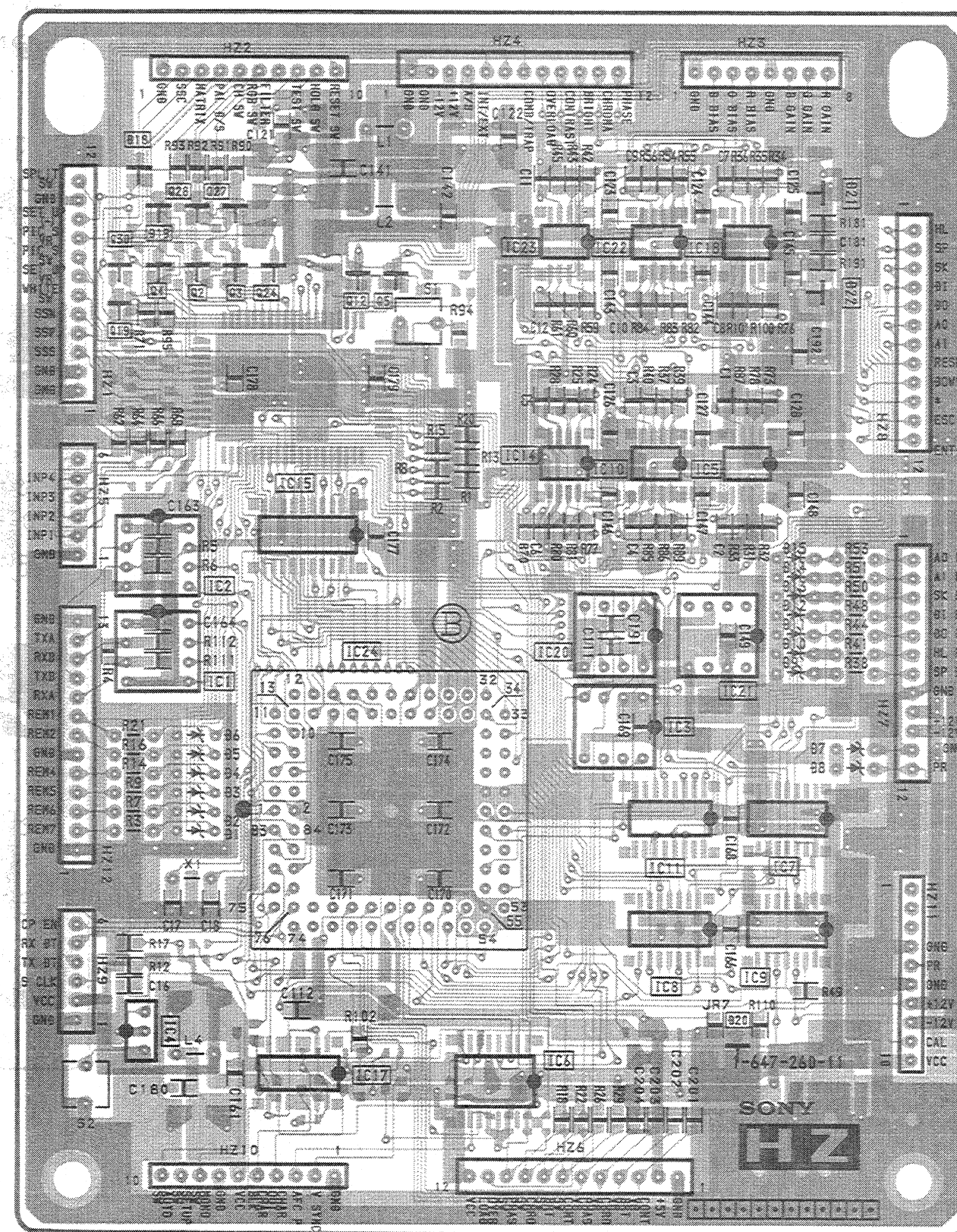
IC	Q	D
23 22 18	28, 27 30 4 2 3 24 19 12 5	18 19 21 22
14 10 5		15 14 13 12 11 10 9
2 15		7 8
20 21		6 5 4 3 2 1
3		20
24		
11 7		
8 9		
4		
17 6		

5-84



— COMPONENT SIDE —

IC	Q	D
23 22 18	28, 27 30 4 2 3 24 19 12 5	18 19 21 22
14 10 5		
2 15		15 14 13 12 11 10 9
1 20 21		6 5 4 3 2 1
3		7 8
24 11 7		
8 9		20
4 17 6		

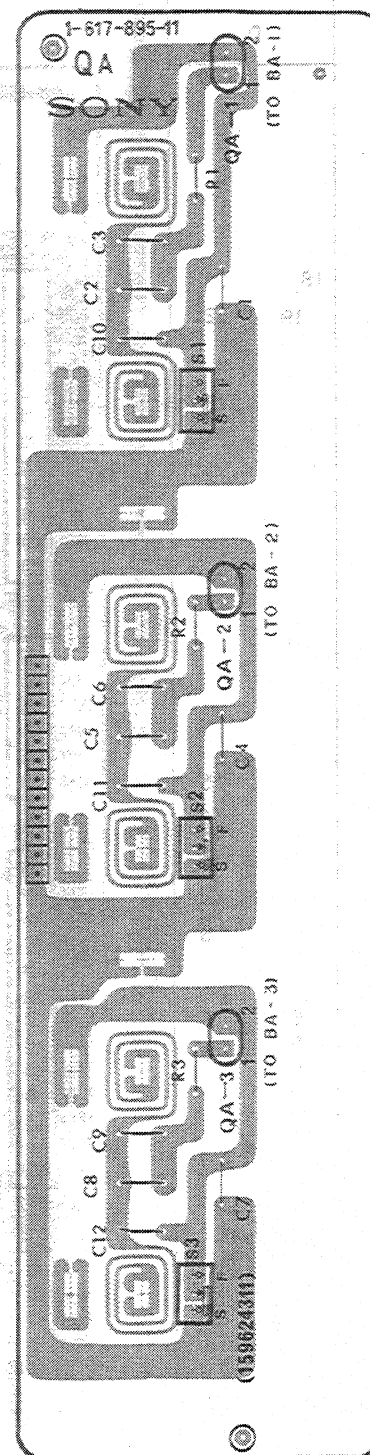


5. DIAGRAMS

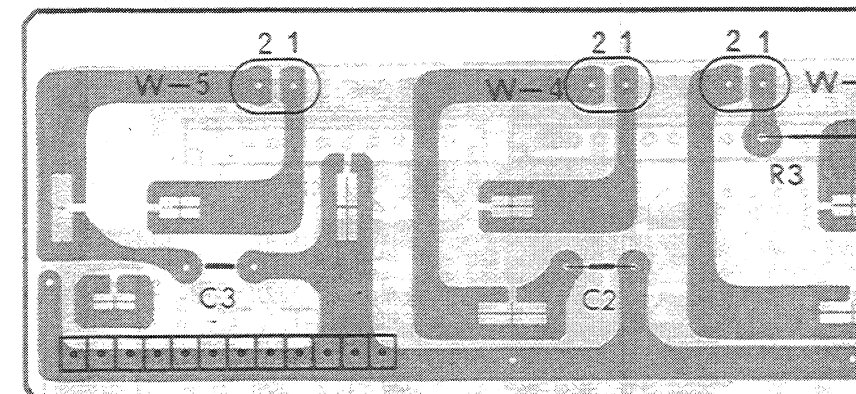
- : Pattern from the side which enables seeing.
- : Pattern of the rear side.



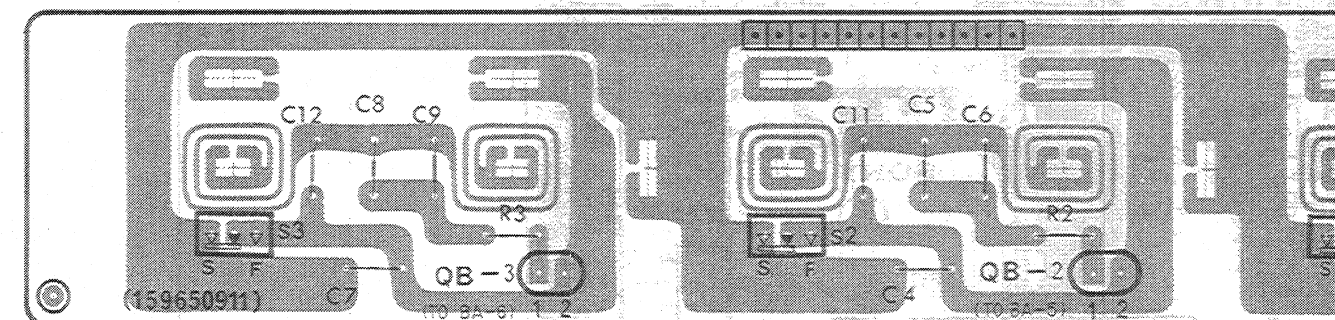
QA board (COMPOSITE VIDEO INPUT)



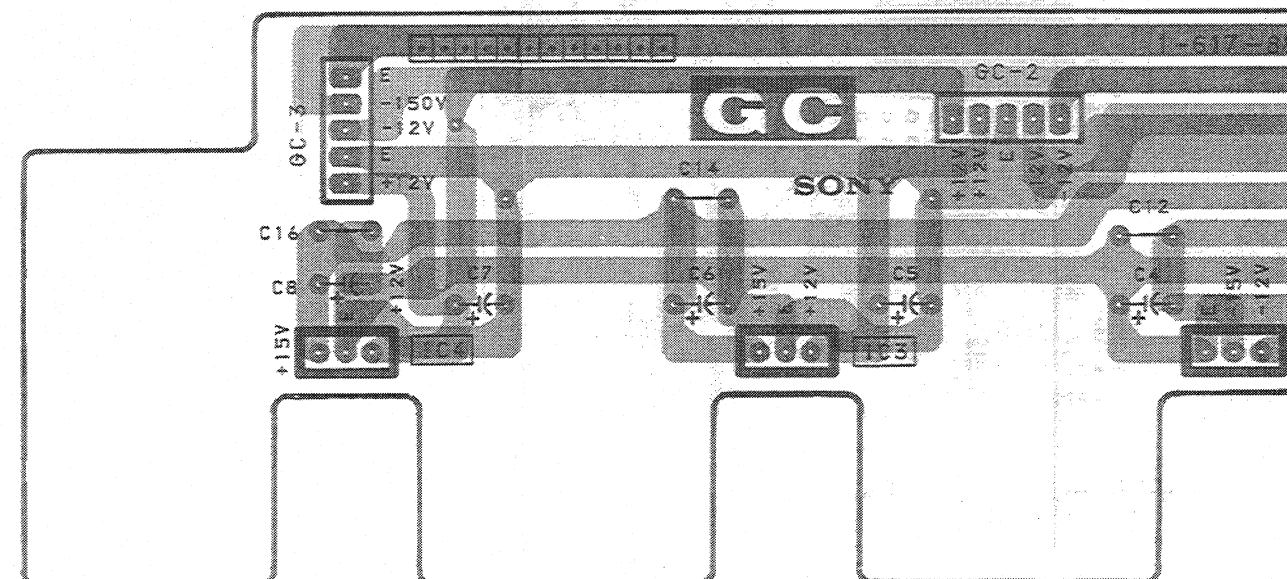
W board (RGB/COMPONENT OUT)



QB board (RGB/COMPONENT INPUT)



GC board (REG)





GC, QA, QB, V, W GC, QA, QB, V, W

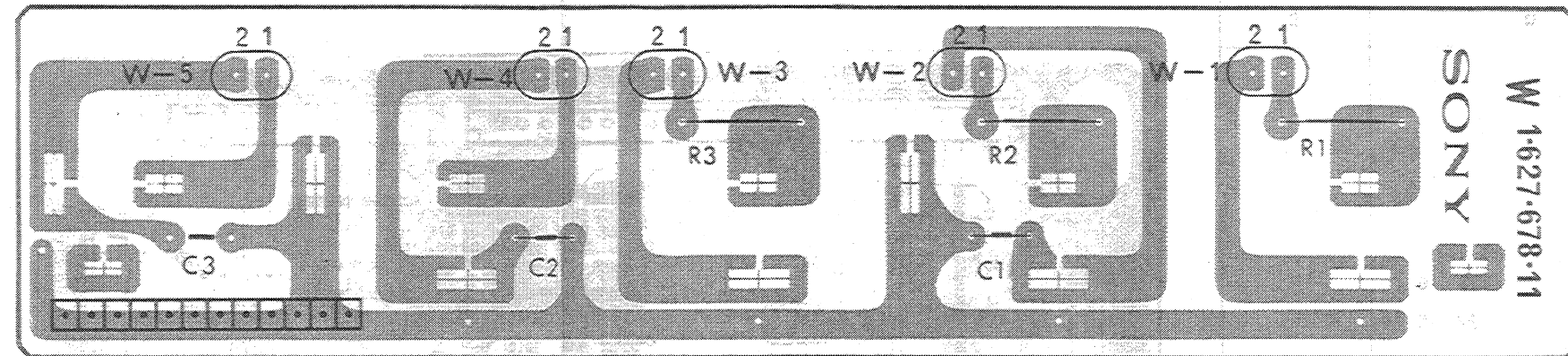
UDATMCO M3T2Y21 51600 V1

5-87 1-617-895-11

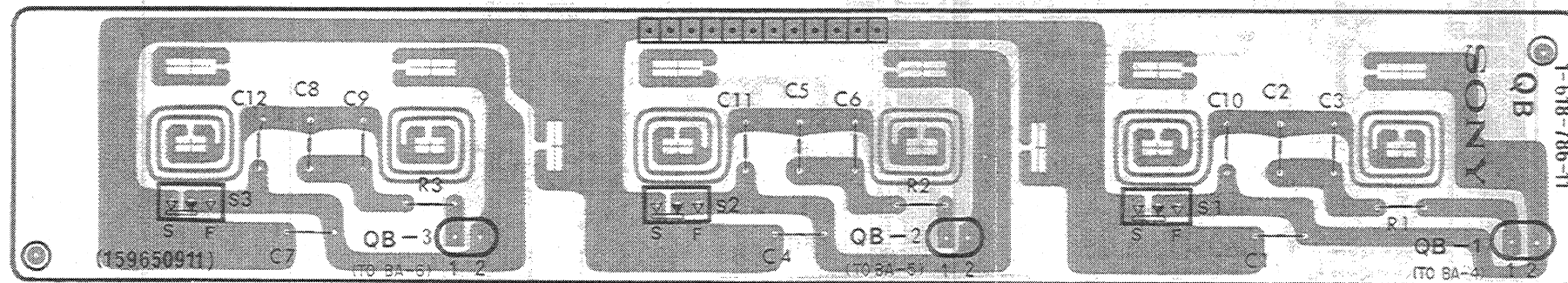
QA board (COMPOSITE VIDEO INPUT)

COMPOSITE VIDEO

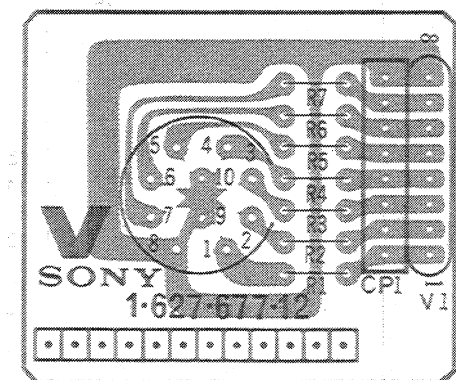
W board (RGB/COMPONENT OUT)



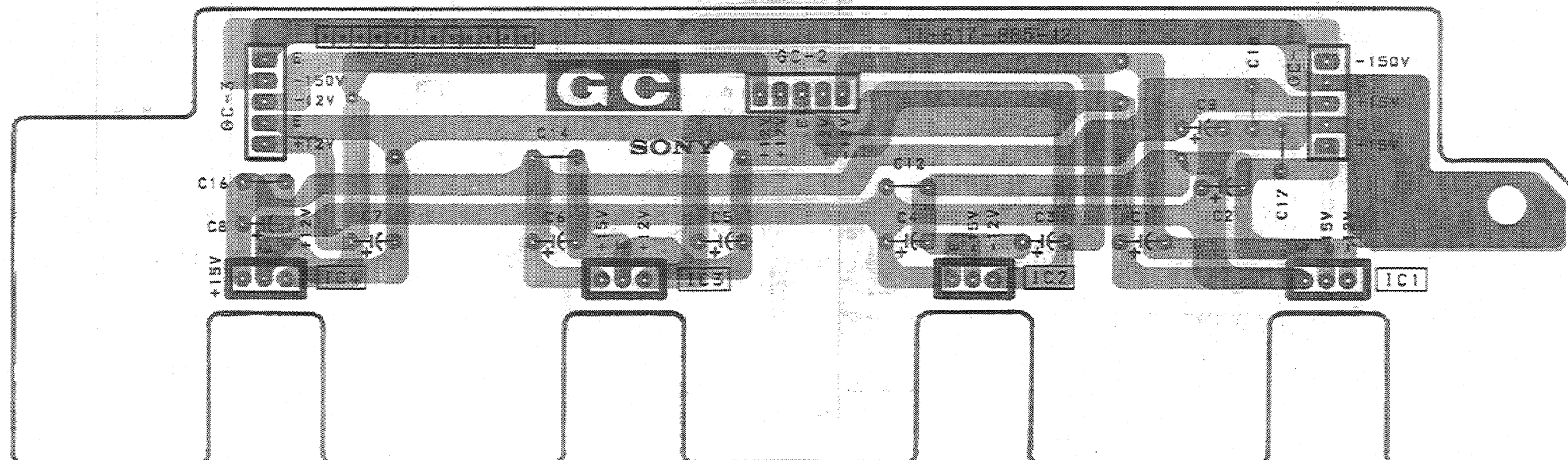
QB board (RGB/COMPONENT INPUT)



V board (REMOTE)



GC board (REG)

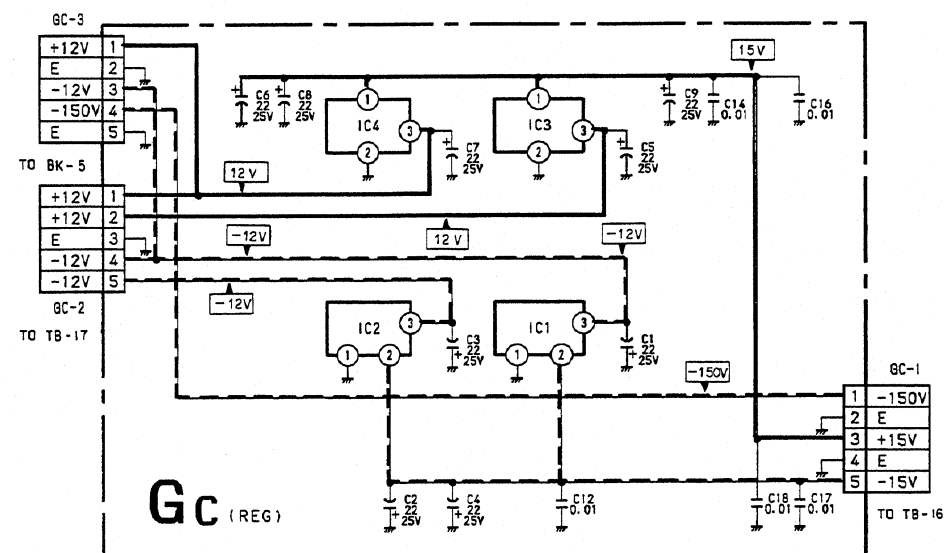
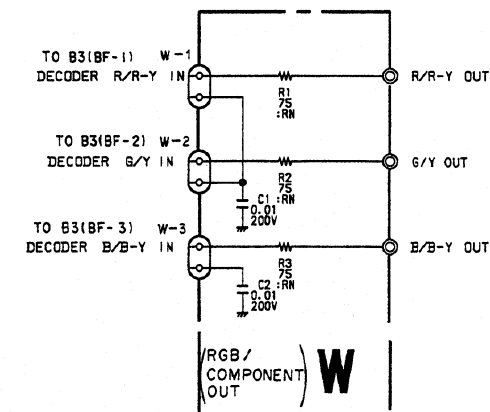
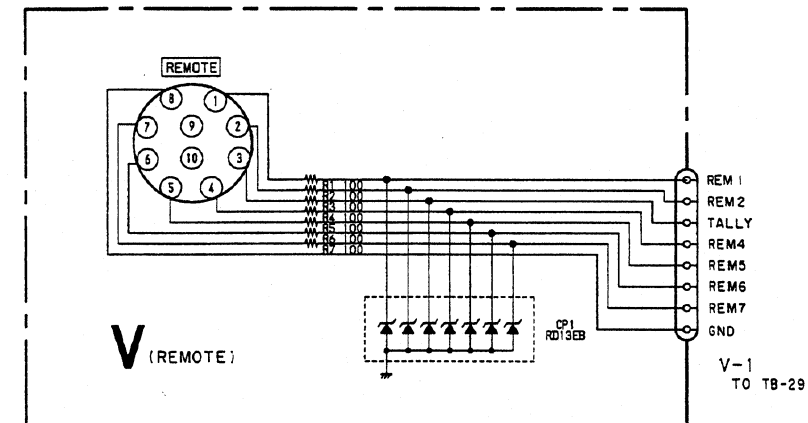
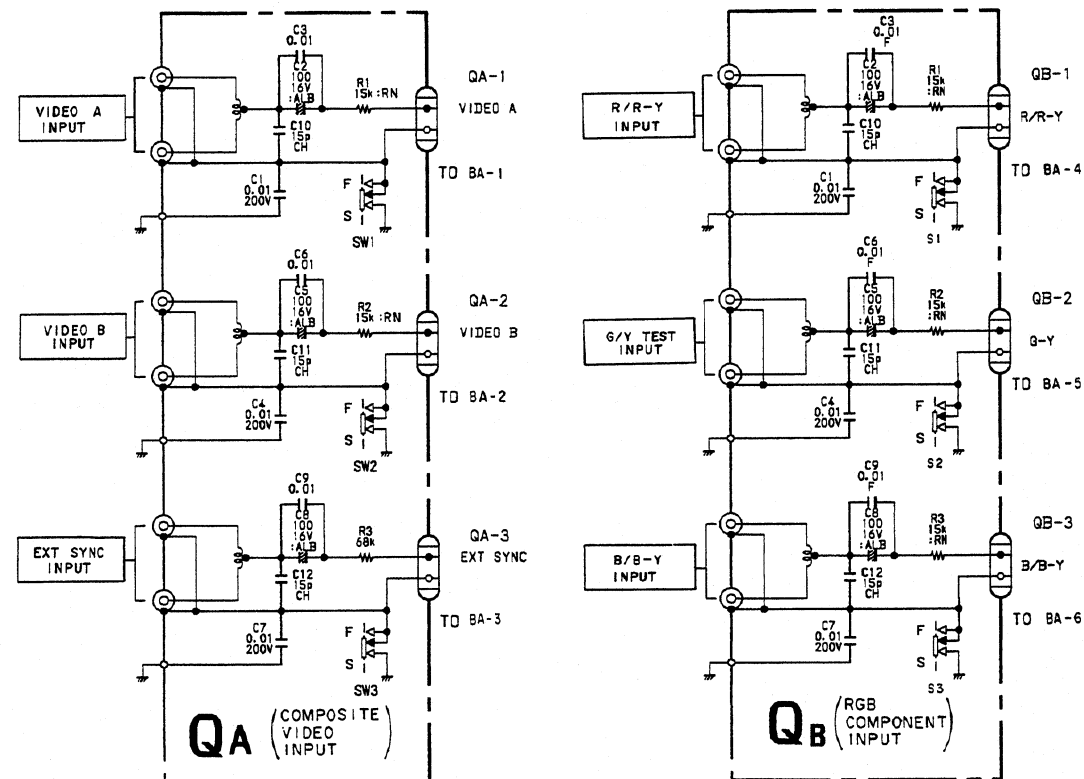


# GC, QA, QB, V, W GC, QA, QB, V, W

GC board (REG) QA board (COMPOSITE VIDEO INPUT) QB board (RGB/COMPONENT INPUT)  
V board (REMOTE) W board (RGB/COMPONENT OUT)

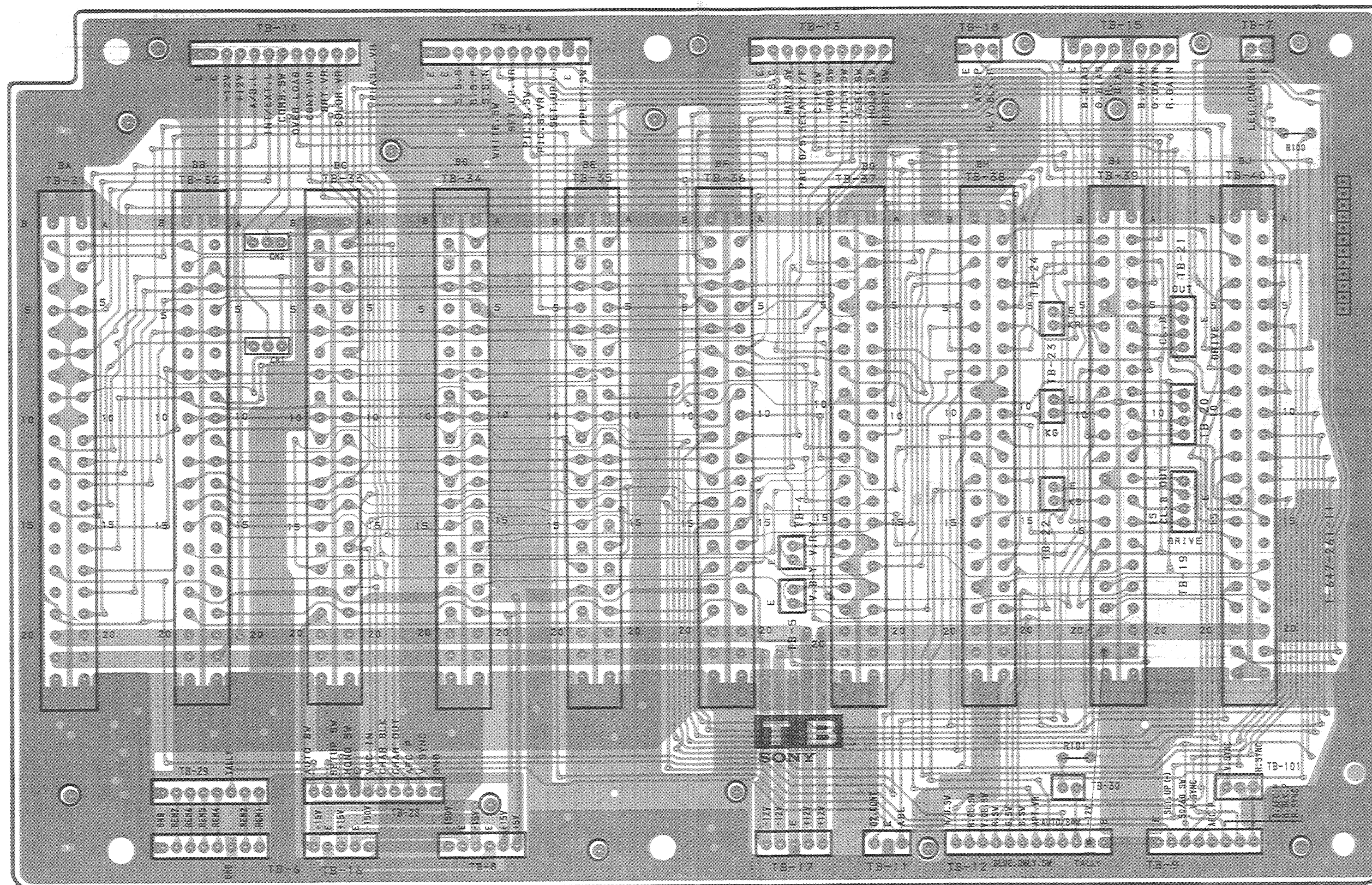
GC BOARD


IC1	uPD7912H	-12V REG
2	uPD7912H	-12V REG
3	uPD7812H	+12V REG
4	uPD7812H	+12V REG





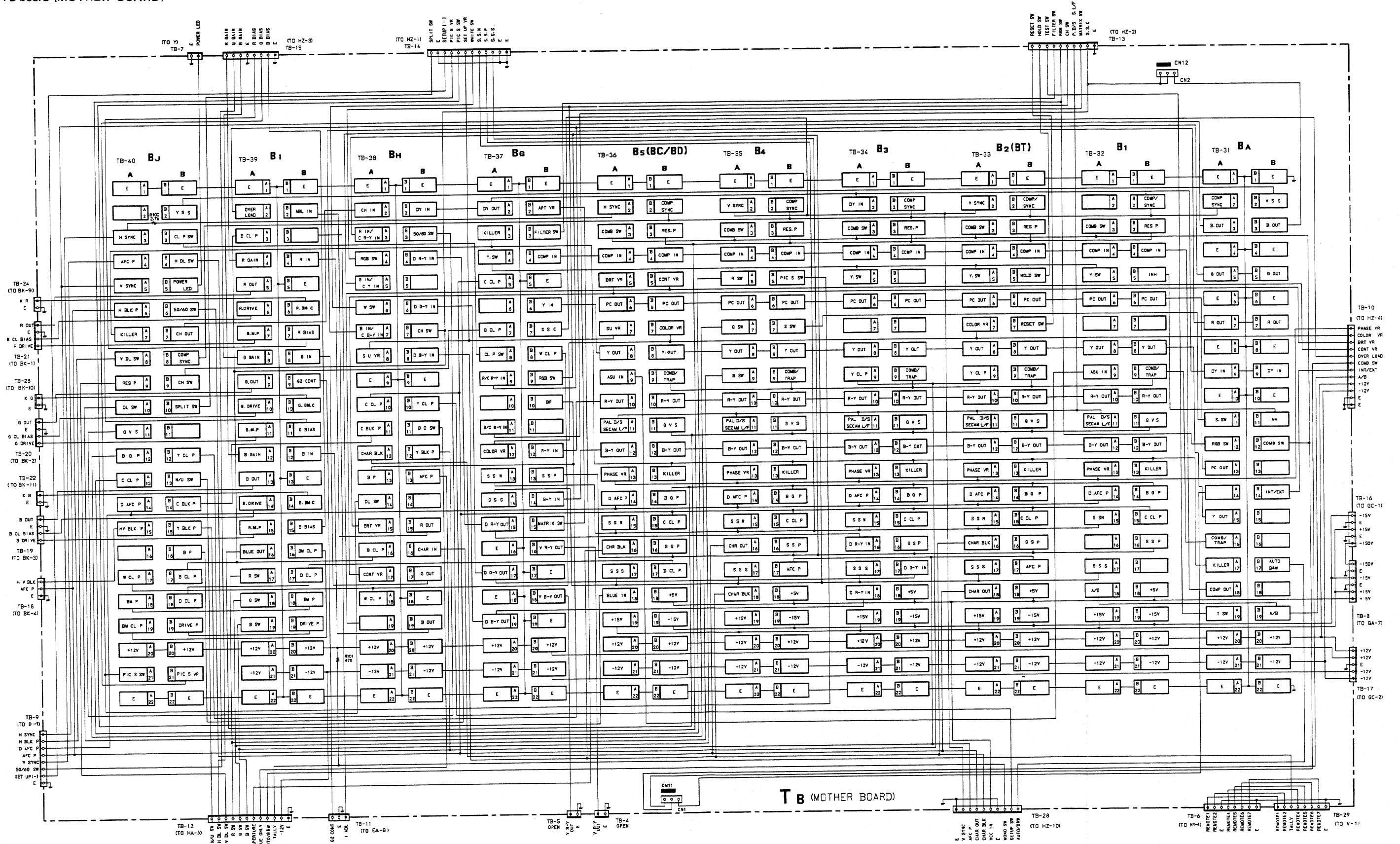
TB board (MOTHER BOARD)

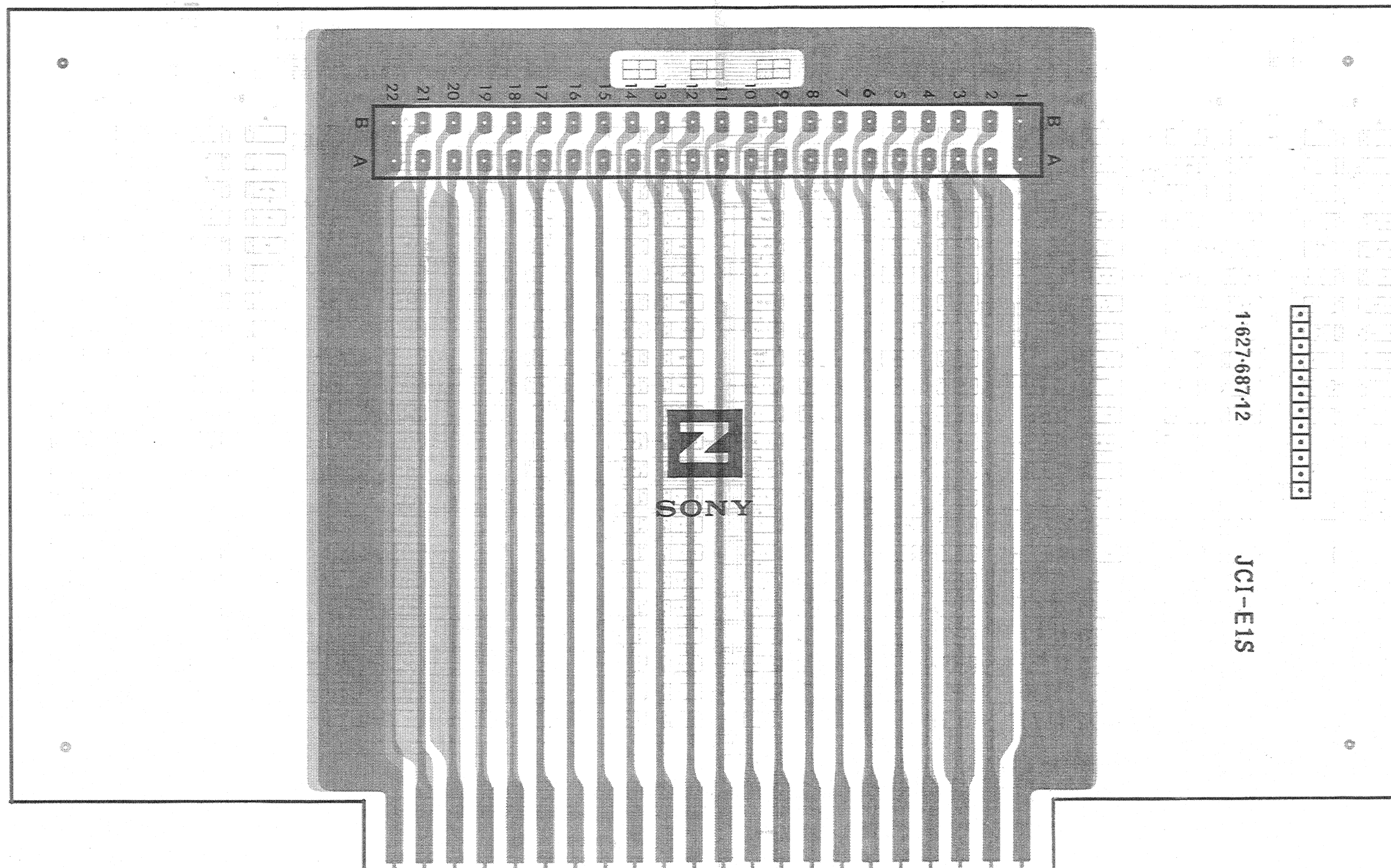




-  : Pattern from the side which enables seeing.
-  : Pattern of the rear side.



TB board (MOTHER BOARD)

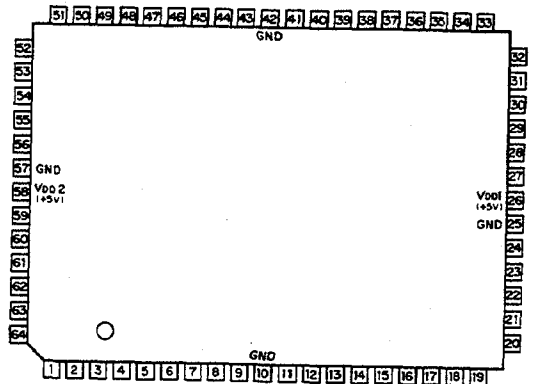




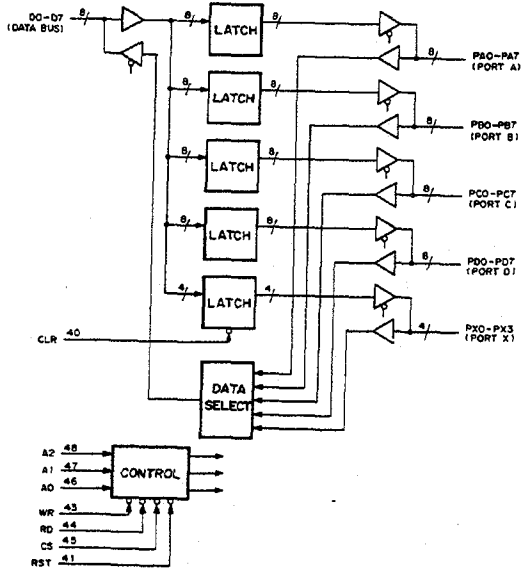
-  : Pattern from the side which enables seeing.
-  : Pattern of the rear side.

## 5. DIAGRAMS

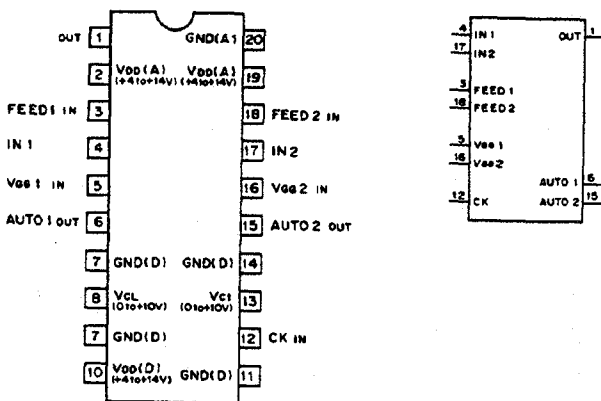
CXD1095Q (SONY) FLAT PACKAGE  
C-MOS I/O PORT EXPANDER  
— TOP VIEW —



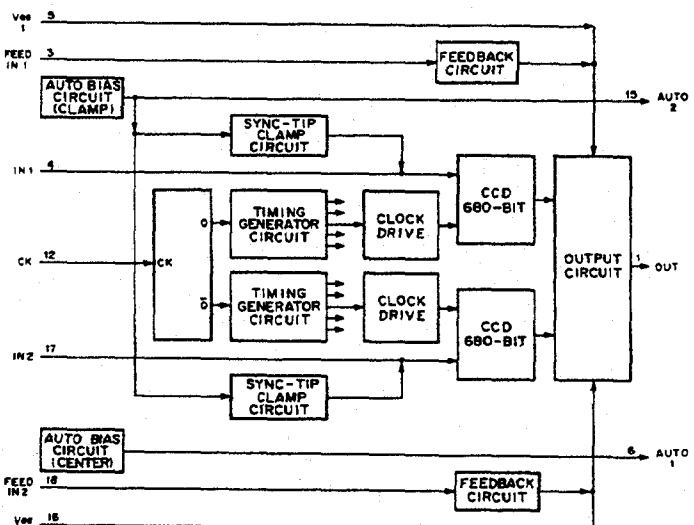
PIN NO.	IN	OUT	SYMBOL	PIN NO.	IN	OUT	SYMBOL	PIN NO.	IN	OUT	SYMBOL	PIN NO.	IN	OUT	SYMBOL
1			NC	17	O	O	PC6	33			NC	49	O	O	PX0
2			NC	18	O	O	PC7	34			NC	50	O	O	PX1
3	O	O	PB1	19			NC	35	O	O	D3	51			NC
4	O	O	PB2	20	O	O	PD0	36	O	O	D4	52	O	O	PX2
5	O	O	PB3	21	O	O	PD1	37	O	O	D5	53	O	O	PX3
6	O	O	PB4	22	O	O	PD2	38	O	O	D6	54	O	O	PA0
7	O	O	PB5	23	O	O	PD3	39	O	O	D7	55	O	O	PA1
8	O	O	PB6	24	O	O	PD4	40	O	O	CLR	56	O	O	PA2
9	O	O	PB7	25			GND	41			RST	57			GND
10			GND	26	O	O	VDD(+5V)	42			GND	58	O	O	VDD(+5V)
11	O	O	PC0	27	O	O	PD5	43	O	O	WR	59	O	O	PA3
12	O	O	PC1	28	O	O	PD6	44	O	O	RD	60	O	O	PA4
13	O	O	PC2	29	O	O	PD7	45	O	O	CS	61	O	O	PA5
14	O	O	PC3	30	O	O	D0	46	O	O	A0	62	O	O	PA6
15	O	O	PC4	31	O	O	D1	47	O	O	A1	63	O	O	PA7
16	O	O	PC5	32	O	O	D2	48	O	O	A2	64	O	O	PB0



CXL1009P (SONY)  
C-MOS CCD SIGNAL PROCESSOR FOR TBC  
— TOP VIEW —

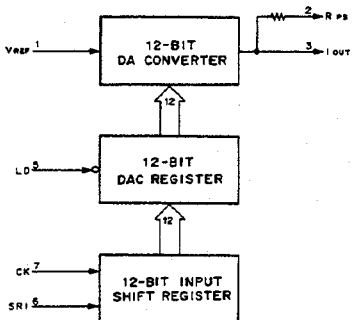
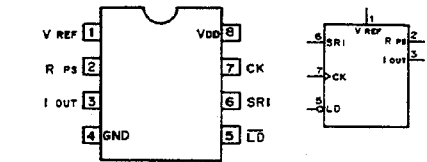


OUT : OUT PUT  
FEED 1/2 IN : FEEDBACK INPUT 1/2  
IN 1/2 : INPUT 1/2  
VDD 1/2 IN : GATE INPUT 1/2  
AUTO 1/2 OUT : AUTO BIAS OUTPUT 1/2  
CK IN : CLOCK INPUT  
VCL : POWER SUPPLY 2(DIGITAL)  
VDD(A)/(D) : POWER SUPPLY 1(ANALOG)/(DIGITAL)  
GND(A)/(D) : GROUND(ANALOG)/(DIGITAL)

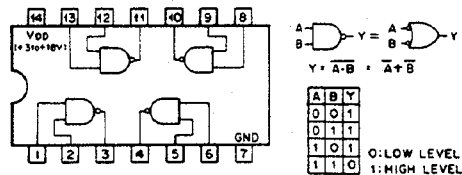




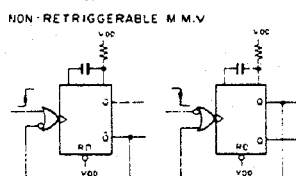
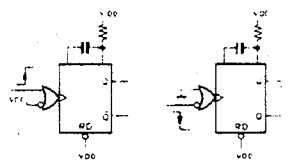
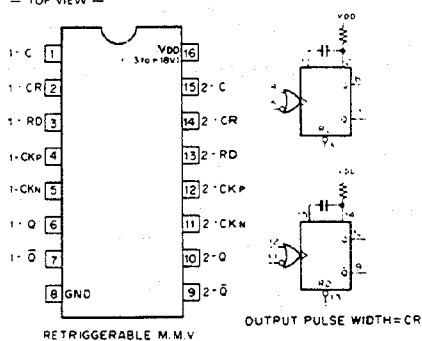
DAC8043GP (PMI)  
CMOS 12-BIT SERIAL INPUT D/A CONVERTER  
- TOP VIEW -



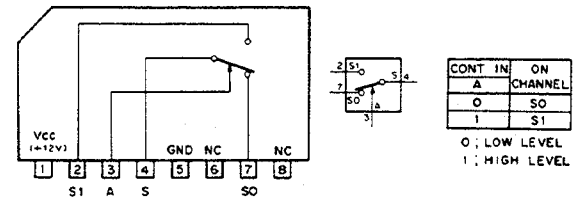
HD14011BP (HITACHI)  
MC14011BCP (MOTOROLA)  
TC4011BP (TOSHIBA)  
uPD4011BC (NEC)  
CMOS 2-INPUT NAND GATE  
- TOP VIEW -



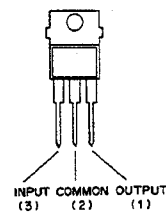
HD14538BP (HITACHI)  
CMOS DUAL RETRIGGERABLE NON RETRIGGERABLE  
MONOSTABLE MULTIVIBRATOR  
- TOP VIEW -



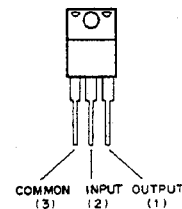
LA7016 (SANYO)  
ELECTRONIC SWITCH  
- SIDE VIEW -



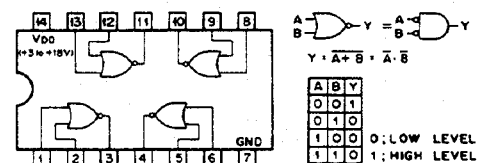
LM7812CT  
POSITIVE VOLTAGE REGULATOR (500mA)  
- FRONT VIEW -



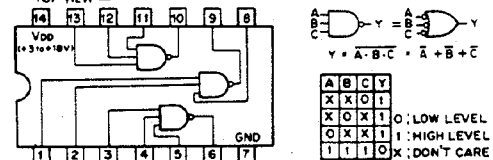
LM7912CT (NS) - 12V  
NEGATIVE VOLTAGE REGULATOR  
- FRONT VIEW -

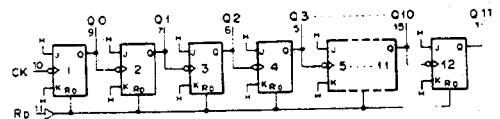
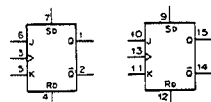
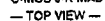


MC14001BCP (MOTOROLA)  
uPD4001BC (NEC)  
CMOS 2-INPUT NOR GATE  
- TOP VIEW -

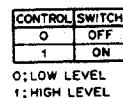
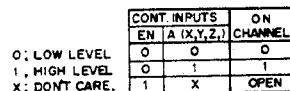
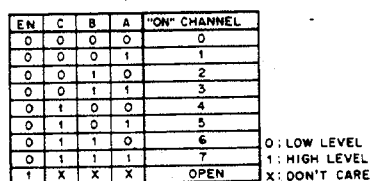


MC14023BCP (MOTOROLA)  
TC4023BP (TOSHIBA)  
CMOS 3-INPUT NAND GATE  
- TOP VIEW -

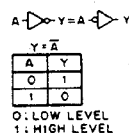




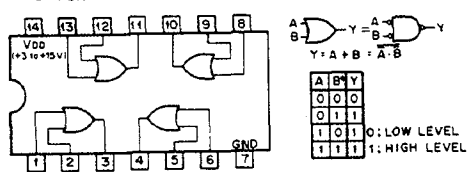
0; LOW LEVEL  
1; HIGH LEVEL



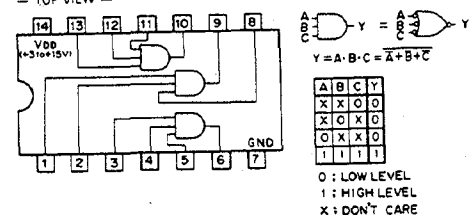
- TOP VIEW -



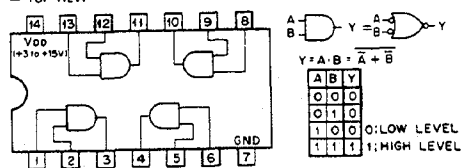
MC14071BCP (MOTOROLA)  
TC4071BP (TOSHIBA)  
UPD4071BC (NEC)  
C-MOS 2-INPUT OR GATE  
— TOP VIEW —



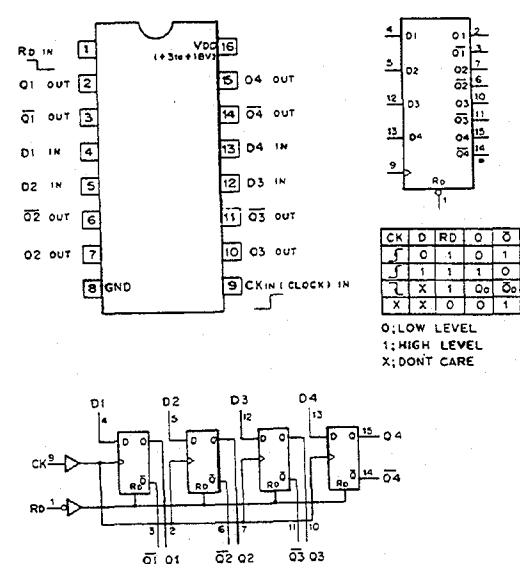
MC14073BCP (MOTOROLA)  
TC4073BP (TOSHIBA)  
C-MOS 3-INPUT POSITIVE AND GATE  
— TOP VIEW —



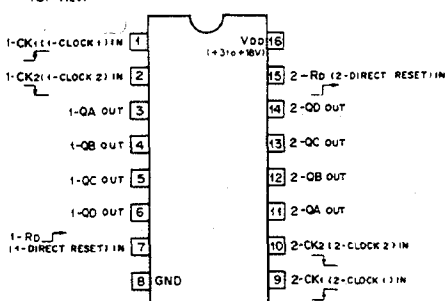
MC14081BCP (MOTOROLA)  
TC4081BP (TOSHIBA)  
UPD4081BC (NEC)  
C-MOS 2-INPUT AND GATE  
— TOP VIEW —



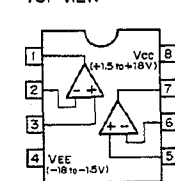
MC14175BCP (MOTOROLA)  
C-MOS DECADE COUNTER/DIVIDER  
— TOP VIEW —



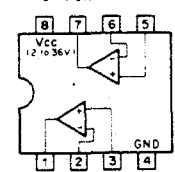
MC14520BCP (MOTOROLA)  
TC4520BP (TOSHIBA)  
C-MOS DUAL 4-BIT BINARY UP COUNTER  
— TOP VIEW —



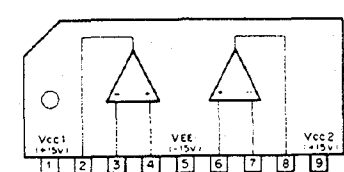
NJM082M (JRC) FLAT PACKAGE  
uPC4082C  
OPERATIONAL AMPLIFIER  
(JFET INPUT)  
— TOP VIEW —



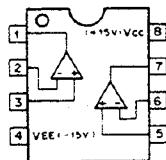
NJM2903D (JRC)  
VOLTAGE COMPARATOR  
— TOP VIEW —



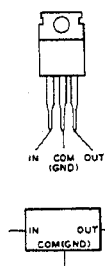
NJM4558S (JRC)  
HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER  
— SIDE VIEW —



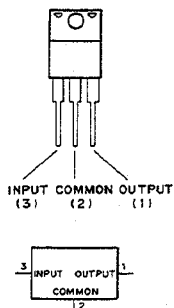
NJM4558D (JRC)  
uPC4558C (NEC)  
uPC4553C  
OPERATIONAL AMPLIFIER  
- TOP VIEW -



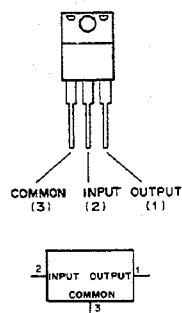
NJM7805FA  
NJM7809FA  
NJM7812FA  
POSITIVE VOLTAGE REGULATOR (1A)  
- SIDE VIEW -



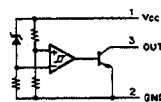
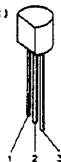
NJM78M05FA (JRC) +5V  
NJM78M12FA (JRC) +12V  
POSITIVE VOLTAGE REGULATOR  
- FRONT VIEW -



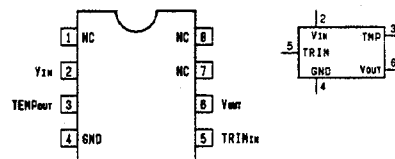
NJM79M05FA (JRC) -5V  
NJM79M12FA (JRC) -12V  
NEGATIVE VOLTAGE REGULATOR  
- FRONT VIEW -



PST529C (MITSUMI)  $V_s = 4.5V$   
VOLTAGE DETECTOR, SYSTEM RESET  
(MITSUMI)

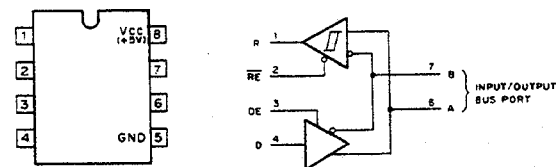


REF-02EZ (PMI)  
REFERENCE/TEMPERATURE TRANSDUCER  
- TOP VIEW -



$V_{IN}$  : INPUT VOLTAGE (+7Vcc+40V)  
 $TEN_{OUT}$  : TEMPERATURE TRANSDUCER  
VOLTAGE OUTPUT (2.1mV/°C)  
 $TRIN_{IN}$  : OUTPUT SIGNAL TRIMMING  
 $V_{OUT}$  : OUTPUT VOLTAGE (+5V)

SN75176BP (TI)  
TTL-DIFFERENTIAL BUS TRANSCEIVER  
- TOP VIEW -



FUNCTION TABLE  
- DRIVER -

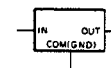
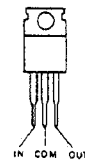
INPUT	ENABLE	OUTPUT
D	DE	A B
1	1	1 0
0	1	0 1
X	0	Hi-Z Hi-Z

1 : HIGH LEVEL  
0 : LOW LEVEL  
X : DON'T CARE  
Hi-Z : HIGH IMPEDANCE  
? : INDETERMINATE

- RECEIVER -

DIFFERENTIAL INPUTS	ENABLE	OUTPUT
A-B	RE	R
$V_{ID} > 0.2V$	0	1
$-0.2V < V_{ID} < 0.2V$	0	?
$V_{ID} < -0.2V$	0	0
X	1	Hi-Z

TA7812S  
POSITIVE VOLTAGE REGULATOR (0.5A)  
- SIDE VIEW -



G-Y OUT	1	24	R-Y OUT
B-Y IN	2	23	B-Y OUT
R-Y IN	3	22	Vcc (+12V)
ALT PULSE IN	4	21	BYPASS
OSC BIAS OUT	5	20	COLOR CONT
OSC IN	6	19	CHROMA OUT
OSC IN	7	18	UNICOLOR CONT
OSC OUT	8	17	BURST OUT
APC FILTER	9	16	ACC FILTER
APC FILTER	10	15	ACC AMP IN
BURST IN	11	14	BYPASS
12	GND	13	BURST GATE IN

The diagram illustrates the internal circuitry of a color television receiver. It shows the flow of video signals from the input (B-Y, G-Y, R-Y) through various processing blocks to the output (R-Y). Key components include demodulators, a matrix, color control, automatic color control (ACC) circuit, burst gate, band pass amplifier, killer amplifier, identification amplifier, color wheel oscillator (C.W. OSC), alternate pulse generator, phase control, identification killer detector, and automatic phase control (APC) circuit. Signal lines are numbered 1 through 24, indicating the sequence of the signal path.

**Y**

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0: LOW LEVEL  
1: HIGH LEVEL

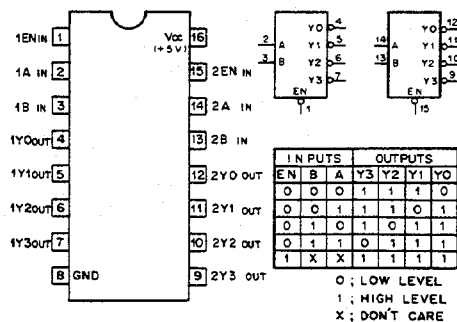
[illegible]

SO IN 1  
OE1 IN 2  
OE2 IN 3  
G/QG I/O 4  
E/QE I/O 5  
C/QC I/O 6  
A/QA I/O 7  
QA OUT 8  
RD IN 9  
GND 10  
Vcc (+5V) 20  
S1 IN 19  
SL IN 18  
QH OUT 17  
H/QH I/O 16  
F/QF I/O 15  
G/QG I/O 14  
W/QW I/O 13  
QA 12  
QH 11  
RD 10  
OE 9  
SO 8  
S1 7  
SL 6  
QH OUT 5  
H/QH I/O 4  
F/QF I/O 3  
G/QG I/O 2  
W/QW I/O 1  
QA 14  
QH 13  
RD 12  
OE 11

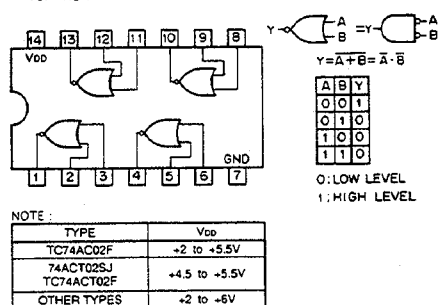
SO : FUNCTION SELECT 0  
S1 : FUNCTION SELECT 1  
SL : SHIFT LEFT  
SR : SHIFT RIGHT  
OE1, OE2 : OUTPUT ENABLE

MODE	INPUTS								INPUTS/OUTPUTS								OUTPUTS	
	RD	CK	FUNCTION		ENABLE	SHIFT		A	B	C	D	E	F	G	H	QA	QH	
			SO	SI	OE1	OE2	SL											SR
CLEAR	0	X	0	X	0	0	X	X	0	0	0	0	0	0	0	0	0	
	0	X	0	X	0	0	X	X	0	0	0	0	0	0	0	0	0	
HOLD	1	X	0	0	0	0	X	X	QA	OB	OC	OD	OE	OF	OG	QH	QA	
	1	0	X	X	0	0	X	X	QA	OB	OC	OD	OE	OF	OG	QH	QA	
SHIFT RIGHT	1	$\overline{S}$	1	0	0	0	X	1	QA	OB	OC	OD	OE	OF	OG	QH	QA	
	1	$\overline{S}$	1	0	0	0	X	0	QA	OB	OC	OD	OE	OF	OG	QH	QA	
SHIFT LEFT	1	$\overline{S}$	0	1	0	0	1	X	QB	OC	OD	OE	OF	OG	QH	1	QB	
	1	$\overline{S}$	0	1	0	0	0	X	QB	OC	OD	OE	OF	OG	QH	0	QB	
LOAD	1	$\overline{S}$	1	1	X	X	X	X	a	b	c	d	e	f	g	h	a	
OUTPUT ENABLE	X	X	X	X	1	X	X	X	HIGH - IMPEDANCE (INTERNAL LOGIC IS NOT AFFECTED)								QA	QH
	X	X	X	X	X	1	X	X									QA	QH

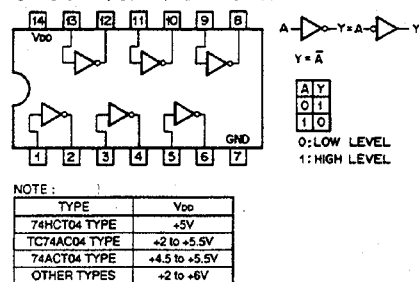
TC74HCT139AF  
TTL 2-TO-4-LINE DECODER/DEMULTIPLEXER  
— TOP VIEW —



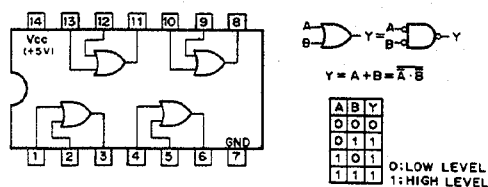
TC74HCT02AF (TOSHIBA) FLAT PACKAGE  
C-MOS QUAD 2-INPUT NOR GATES  
- TOP VIEW -



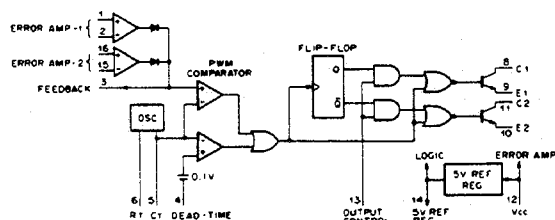
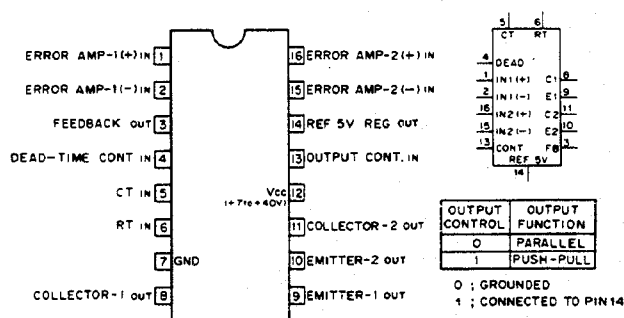
TC74HCT04AF (TOSHIBA) FLAT PACKAGE



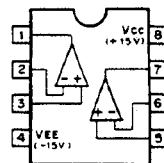
TC74HCT32AF  
TTL 2-INPUT POSITIVE-OR GATE  
- TOP VIEW -



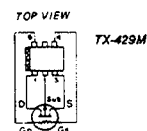
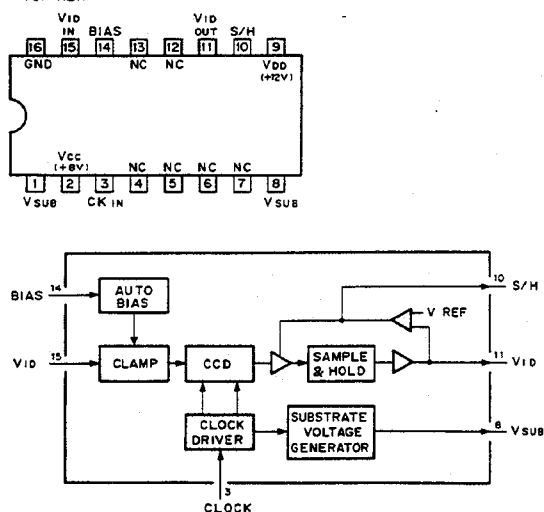
TL494CN (TI)  
PWM POWER CONTROL  
- TOP VIEW -



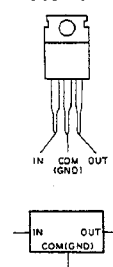
TL082ACP  
TL082CP  
TL082M  
OPERATIONAL AMPLIFIER  
(J FET-INPUT)  
- TOP VIEW -



TL8608AP (TOSHIBA)  
N-CH CCD ANALOG PROCESSING UNIT  
- TOP VIEW -

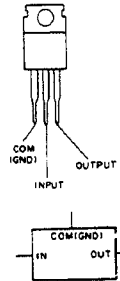


UPC7812H (NEC) +12V  
POSITIVE VOLTAGE REGULATOR (1A)  
- SIDE VIEW -



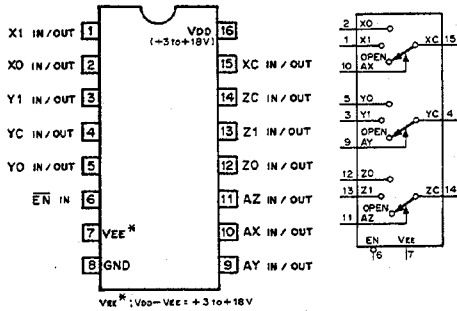


uPC7912H (NEC)  
NEGATIVE VOLTAGE REGULATOR (1A)  
— SIDE VIEW —



OUTPUT VOLTAGE	AN79???	FS79???	UA79???	UC79???	MC79???
-2V	AN7905	FS7905	UA7905UC	UC7905H	MC7905CT
-5V	AN7906	FS7906	UA7906UC	UC7906H	MC7906CT
-5.2V	AN7907	FS7907	UA7907UC	UC7907H	MC7907CT
-6V	AN7908	FS7908	UA7908UC	UC7908H	MC7908CT
-7V	AN7909	FS7909	UA7909UC	UC7909H	MC7909CT
-8V	AN7910	FS7910	UA7910UC	UC7910H	MC7910CT
-9V	AN7911	FS7911	UA7911UC	UC7911H	MC7911CT
-10V	AN7912	FS7912	UA7912UC	UC7912H	MC7912CT
-12V	AN7913	FS7913	UA7913UC	UC7913H	MC7913CT
-15V	AN7914	FS7914	UA7914UC	UC7914H	MC7914CT
-18V	AN7915	FS7915	UA7915UC	UC7915H	MC7915CT
-20V	AN7916	FS7916	UA7916UC	UC7916H	MC7916CT
-24V	AN7917	FS7917	UA7917UC	UC7917H	MC7917CT

uPD4053BC (NEC)  
C-MOS TRIPLE 2-CHANNEL ANALOG MULTIPLEXERS/DEMULTIPLEXERS  
— TOP VIEW —



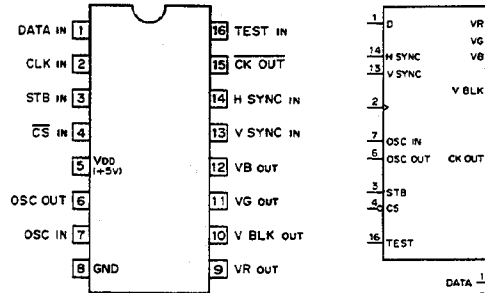
V<sub>EE</sub>\*: V<sub>DD</sub> = V<sub>EE</sub> + 3 to +18V

0: LOW LEVEL  
1: HIGH LEVEL  
X: DON'T CARE.

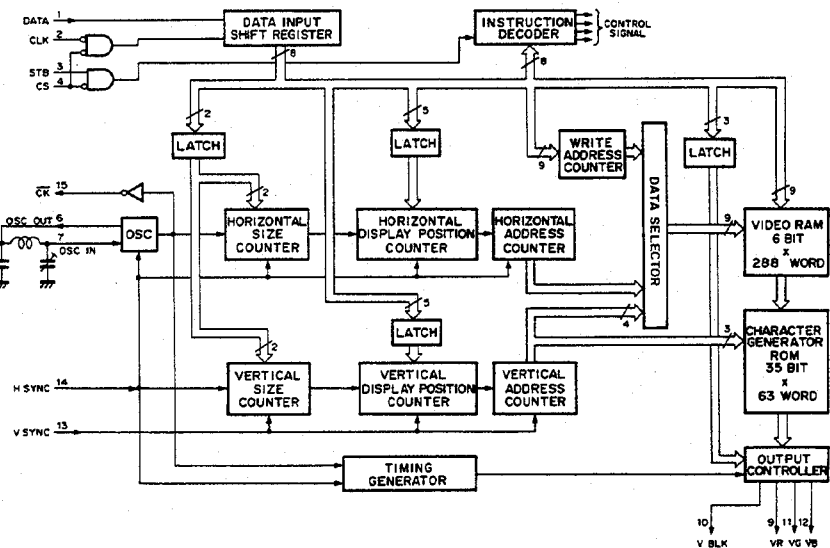
CONT. INPUTS	ON CHANNEL
EN A (X,Y,Z)	
0	0
1	1
X	OPEN

UPD6142G-101 (NEC) FLAT PACKAGE

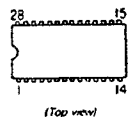
C-MOS 8-BIT SERIAL INPUT CHARACTER DISPLAY  
— TOP VIEW —



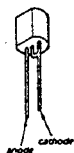
D: DATA INPUT  
CK OUT: EQUAL TO OUTPUT OF OSC OUT  
CLK: CLOCK INPUT  
CS: CHIP SELECT INPUT  
H SYNC: H SYNC INPUT  
H SYNC IN, OUT: EXTERNAL TERMINAL FOR OSC  
STB: STROBE INPUT  
TEST: TEST CLOCK INPUT  
VR: BLUE CHARACTER DATA OUTPUT  
V BLK: V BLANKING OUTPUT  
VG: GREEN CHARACTER DATA OUTPUT  
VR: RED CHARACTER DATA OUTPUT  
V SYNC: V SYNC INPUT



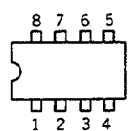
CXA1268P



(Top view)

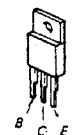


X25040



(Top view)

2SA473  
2SB858  
2SB860  
2SB861  
2SB1094  
2SC1173  
2SC2542  
2SC3675  
2SD1134  
2SD1399



2SA812  
2SA1162  
2SA1226  
2SC1623  
2SC2757  
2SC3624A  
DTA144EK  
DTC144EK



2SA844  
2SA893A  
2SA1091  
2SC1890A  
2SC2551  
2SC2878  
2SC3068



2SA979  
2SA1306



2SA1048  
2SA1115  
2SC2688  
2SC403SP  
DTA124ES  
DTA144ES  
DTC143TS  
DTC144ES  
XDA124ES  
XDA144ES  
XDC144ES



2SA1142



2SA1175  
2SC2785



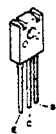
2SA1407  
2SC3298  
2SD669A



2SB734  
2SD774



2SC3955



2SD789



2SD1137



2SK381



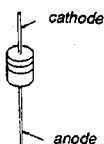
2SK523



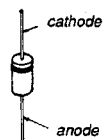
1S2835  
1S2836  
1S2837  
MA152WK



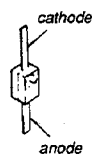
1SS119  
1SS83  
WG713A



10E2  
GP08D  
RD10EB  
RD12EB  
RD12ES  
RD20ES  
RD3.0EB  
RD3.0ES  
RD4.3EB  
RD4.3ES  
RD5.1ES  
RD5.6EB  
RD5.6ES  
RD6.2ES  
RD7.5ES  
RD8.2ES  
RD9.1EB  
RD9.1ES  
RU-3AM



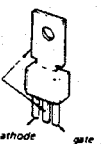
1T25



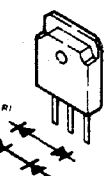
CR02AM-4  
CR02AM-8



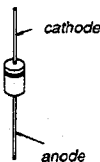
CR3CM-8



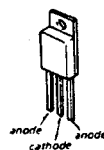
CTU-38R  
CTU-38S



ERB44-06  
ERB81-004  
ERD28-04S  
ERD28-08S  
RH-1A  
SIB01-02



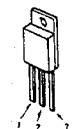
ESAC25-04C



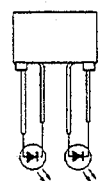
ESAC25-04N  
ESAD25-04D



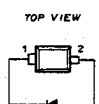
ESAC31-02D



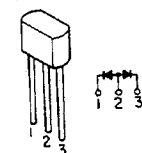
LT-9220H



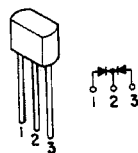
MA110



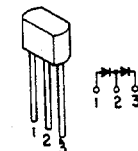
MC911



MC921



MC932



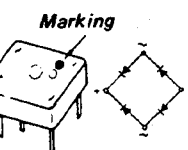
RB406N



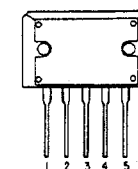
RD5.6M  
RD7.5M



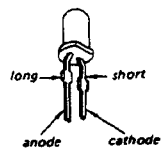
S3WB60Z



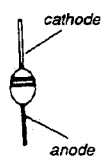
STR8124-R



GL3HYB  
TLG124A  
TLR124  
TLY124



V11N







## SECTION 6 EXPLODED VIEWS

### NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

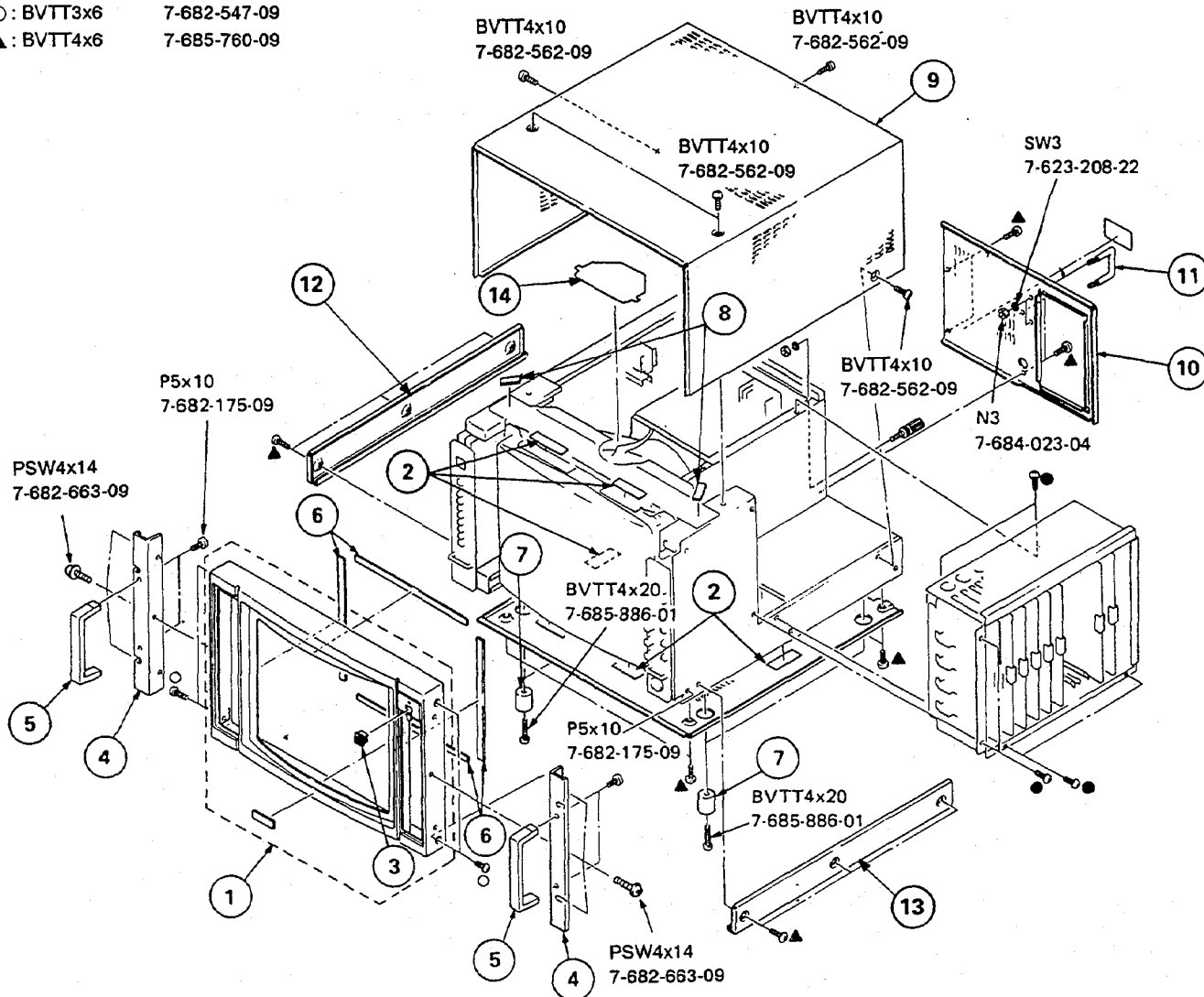
- Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

### 6-1. BEZEL

- : BVTT3x6      7-682-547-04
- : BVTT3x6      7-682-547-09
- ▲ : BVTT4x6      7-685-760-09



6. EXPLODED VIEWS

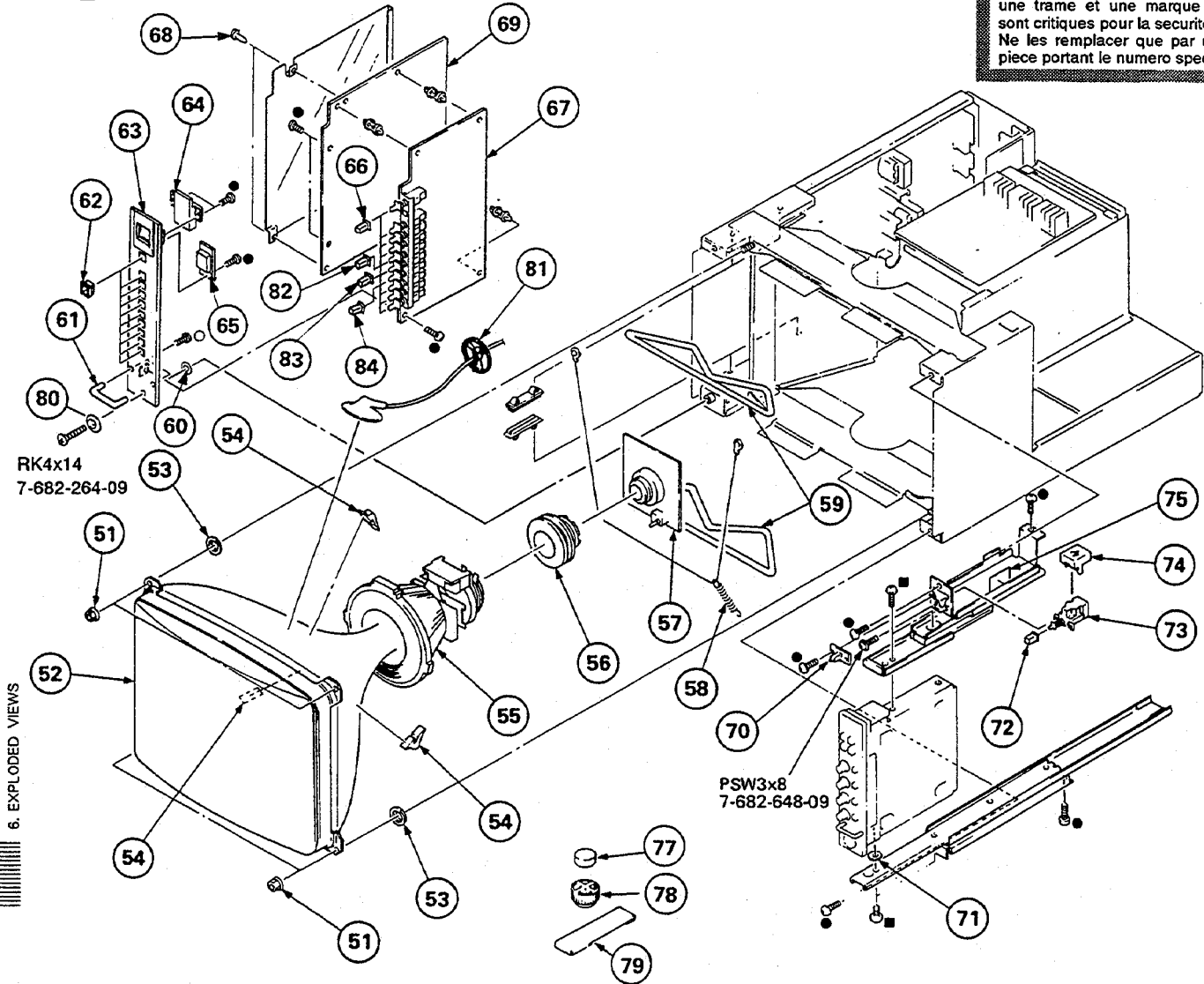
Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	X-4379-403-7	BEZEL ASSY	3	8	9-911-840-XX	DAMPER, CASE (LOWER)	
2	4-864-324-11	SPACER		9	*4-379-461-01	CABINET	
3	4-379-423-11	ESCUTCHEON (A)		10	*4-379-450-01	COVER, BACK	
4	*4-391-207-01	BASE, HANDLE		11	*4-379-476-01	PROTECTOR, CONNECTOR	
5	*4-337-212-11	HANDLE		12	*4-379-452-01	PANEL (LEFT), SIDE	
6	4-308-878-XX	CUSHION, (A) PICTURE TUBE		13	*4-379-444-01	PANEL (RIGHT), SIDE	
7	3-642-656-01	FOOT		14	*4-039-979-01	COVER, ANODE	

## 6-2. PICTURE TUBE

- : BVTT3x6 7-682-547-04
- : BVTT3x6 7-682-547-09
- : B4x6 7-682-560-04

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

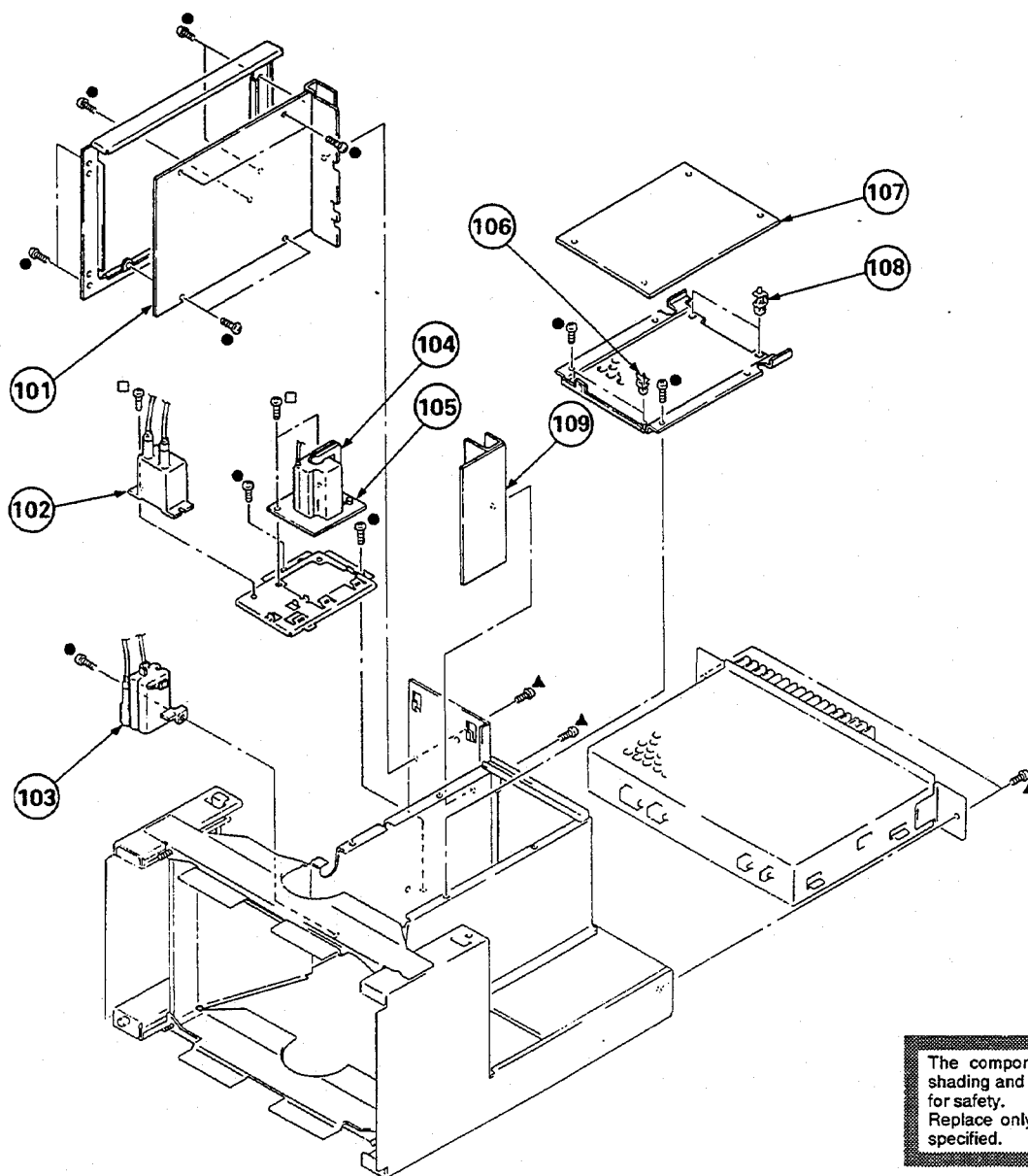
Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	4-306-034-00	FLANGE NUT, (B) 5MM		67	1-642-045-11	HA BOARD	
52	$\Delta$ 8-734-521-05	PICTURE TUBE (M34KBE21X) (BVM-1416P ONLY)		68	*4-302-557-11	CLIP	
	$\Delta$ 8-734-721-05	PICTURE TUBE (M34KBE20X) (BVM-1316 ONLY)		69	A-1345-980-A	D BOARD, COMPLETE	
53	4-348-567-00	WASHER, PICTURE TUBE POSITION		70	*1-627-671-11	Y BOARD	
54	3-703-961-01	SPACER, DY					
55	$\Delta$ 1-451-329-11	DEFLECTION YOKE (Y14FZA)		71	4-866-147-11	SPACER	
56	$\Delta$ 1-452-436-11	NECK ASSY, PICTURE TUBE (NA292)		72	4-374-839-21	BUTTON (A)	
57	*A-1330-902-A	C BOARD, COMPLETE		73	$\Delta$ 1-571-877-11	SWITCH, PUSH (AC POWER) (1 KEY)	
58	4-303-774-XX	SPRING		74	4-393-095-01	COVER, SWITCH, POWER	
59	$\Delta$ 1-426-263-11	COIL, DEMAGNETIZATION		75	*9-911-844-XX	CUSHION, CONTROL BUTTON	
60	3-701-440-21	WASHER, 3-5					
61	4-379-421-01	HANDLE, DRAWER		77	1-452-032-00	MAGNET, DISK; 10MM $\phi$	
62	4-379-423-11	ESCUTCHEON (A)		78	1-452-094-00	MAGNET, ROTATABLE DISK; 15MM $\phi$	
63	4-391-218-11	PANEL (L), CONTROL		79	X-4308-815-0	PERMALLOY ASSY, CONVERGENCE	
64	4-379-418-01	COVER, LAMP		80	3-703-225-11	WASHER (4 DIA.), ORNAMEATAL	
65	*1-627-676-11	X BOARD		81	*3-704-372-01	HOLDER, HV CABLE	
66	4-374-839-21	BUTTON (A)		82	4-374-839-31	BUTTON (A) (R)	
				83	4-374-839-41	BUTTON (A) (G)	
				84	4-374-839-51	BUTTON (A) (B)	

### 6-3. CHASSIS

- : BVTT3x6      7-682-547-04
- : BVTT3x10    7-682-549-04
- ▲ : BVTT4x6      7-685-760-09



The components identified by shading and mark ▲ are critical for safety. Replace only with part number specified.

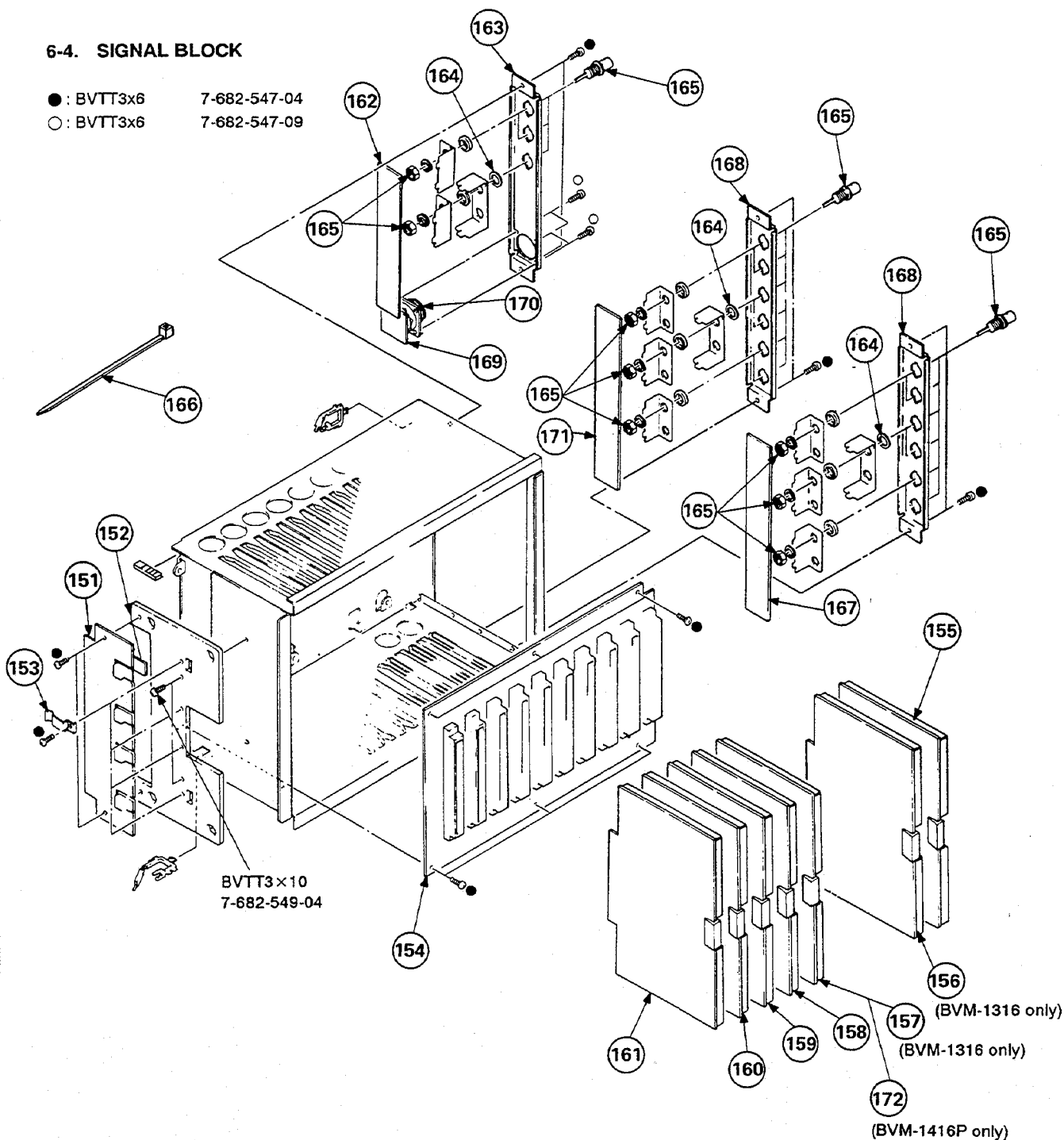
Les composants identifiés par une trame et une marque ▲ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
101	*A-1345-802-A	EA BOARD, COMPLETE		106	*3-703-141-00	HOLDER, PCB	
102	▲ 1-162-142-21	CAP BLOCK, HIGH VOLTAGE		107	*A-1135-523-A	BK BOARD, COMPLETE	
103	▲ 1-238-301-12	RESISTOR ASSY, HIGH-VOLTAGE		108	*4-353-620-02	HINGE, PC BOARD	
104	▲ 1-439-395-11	TRANSFORMER ASSY, FLYBACK (NX-2110)		109	*A-1345-800-A	EB BOARD, COMPLETE	
105	*1-627-670-11	P BOARD					



# 6-4. SIGNAL BLOCK

● : BVTT3x6 7-682-547-04  
○ : BVTT3x6 7-682-547-09



Ref. No. Part No. Description

151 \*1-617-885-11 GC BOARD  
152 4-370-970-01 SPACER, TR  
153 \*4-363-404-00 HOLDER, IC  
154 \*A-1390-344-A TB BOARD, COMPLETE  
155 \*A-1135-355-A BA BOARD, COMPLETE

156 \*A-1135-606-B BT BOARD, COMPLETE (BVM-1316 ONLY)  
157 \*A-1135-357-A BC BOARD, COMPLETE (BVM-1316 ONLY)  
158 \*A-1135-537-A BG BOARD, COMPLETE  
159 \*A-1135-359-A BH BOARD, COMPLETE  
160 \*A-1135-522-A BI BOARD, COMPLETE

161 \*A-1135-361-A BJ BOARD, COMPLETE

Remark

Ref. No. Part No. Description

162 \*1-627-678-11 W BOARD  
163 \*4-391-220-01 PANEL (C), CONNECTOR  
164 \*4-379-404-01 INSULATOR, BNC  
165 1-565-791-11 CONNECTOR, BNC IP  
166 \*3-337-402-01 BAND, BINDING  
167 \*1-617-895-11 QA BOARD  
168 \*4-379-439-01 PANEL (A), CONNECTOR  
169 \*1-627-677-11 V BOARD  
170 1-563-265-11 CONNECTOR, MULTIPLE 10P

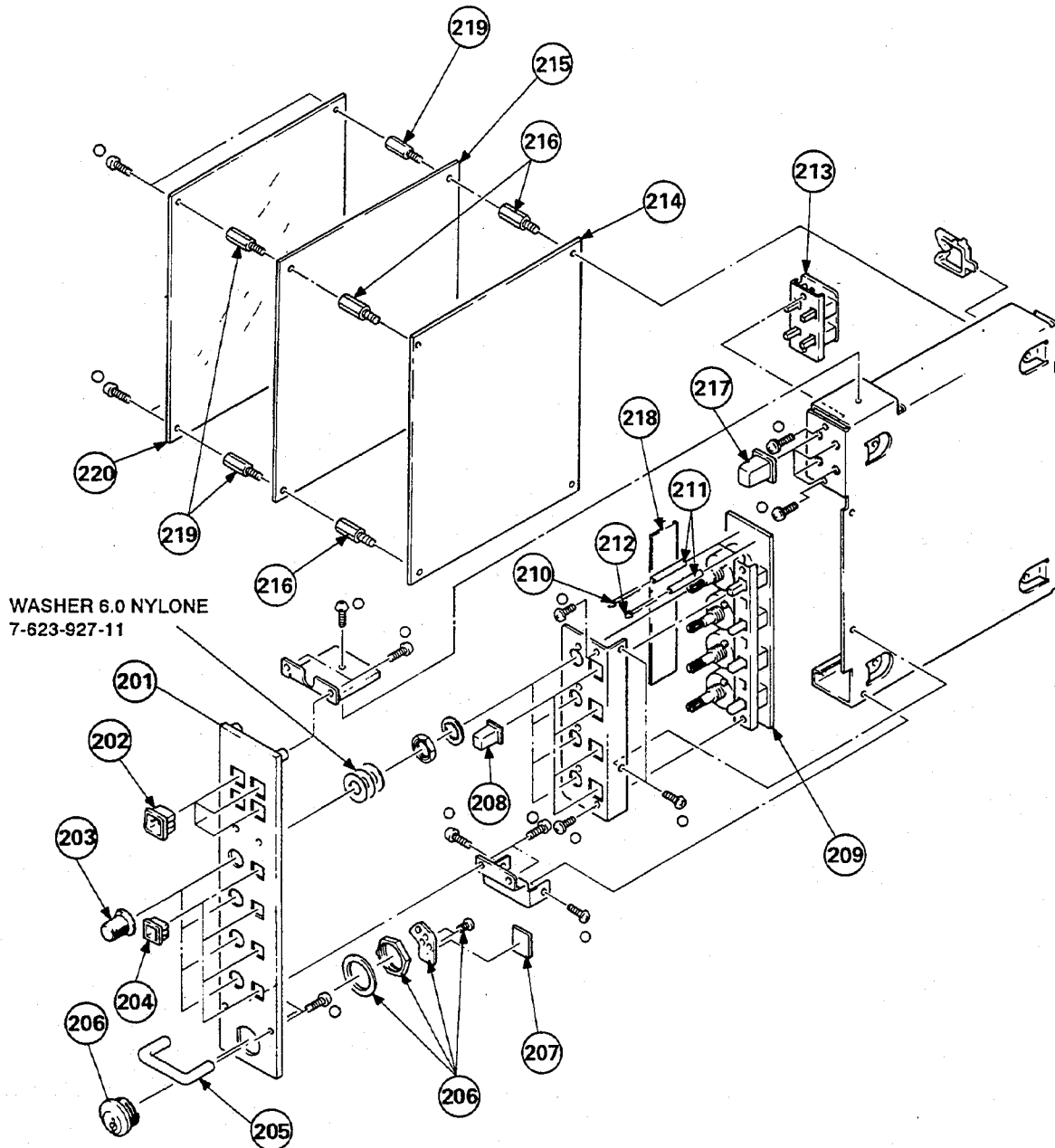
171 \*1-618-786-11 QB BOARD  
172 \*A-1135-391-A BD BOARD, COMPLETE (BVM-1416P ONLY)

Remark

## 6-5. DRAWER BLOCK (RIGHT)

○: BVTT3x6

7-682-547-09

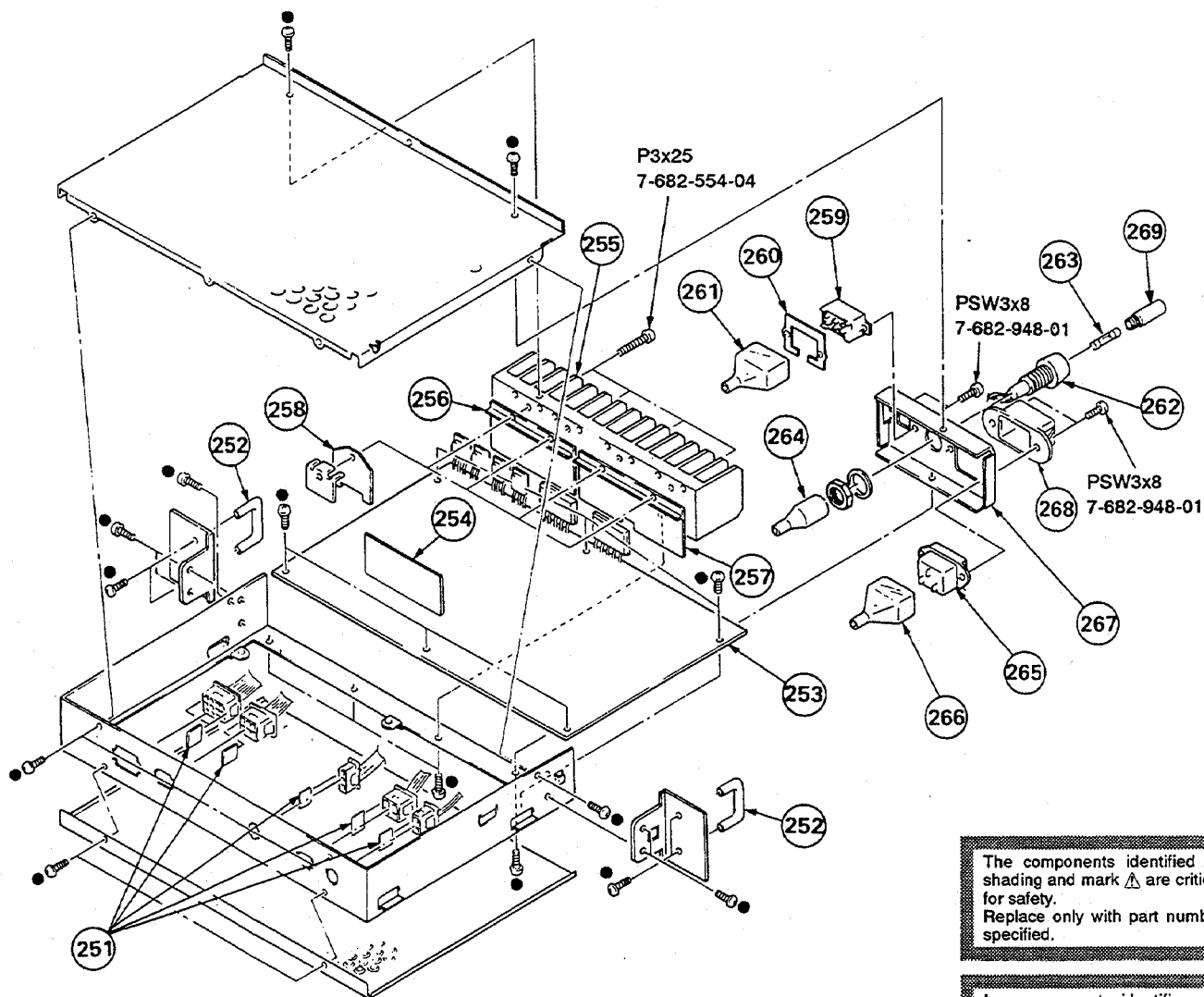


Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
201	4-379-453-21	PANEL (R), CONTROL		211	*4-026-910-00	HOLDER, LED	
202	4-379-423-11	ESCUTCHEON (A)		212	8-719-938-68	DIODE TLY124	
203	X-3673-635-0	KNOB (1) ASSY. CONTROL		213	*1-647-258-11	HX BOARD	
204	4-379-424-11	ESCUTCHEON (B)		214	A-1371-896-A	HZ BOARD, COMPLETE	
205	4-379-421-01	HANDLE, DRAWER		215	A-1375-114-A	HY BOARD, COMPLETE	
206	4-378-917-01	LOCK, CYLINDER		216	*2-264-136-00	SUPPORT, SWITCH, PUSH BUTTON	
207	4-337-209-11	PROTECTOR, SCRATCH		217	4-039-982-01	BUTTON (U)	
208	4-379-422-11	BUTTON (B)		218	*1-627-682-11	HH BOARD	
209	*1-647-257-11	HW BOARD		219	*4-040-721-00	BOSS	
210	8-719-812-41	DIODE TLR124		220	*4-039-977-01	COVER, PC BOARD	

## 6-6. POWER BLOCK

● : BVTT3x6

7-682-547-04



The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
251	3-675-469-00	SPACER, SOLENOID		261	*4-371-879-02	COVER, AC SELECT	
252	4-379-421-01	HANDLE, DRAWER		262	1-533-167-21	HOLDER, FUSE	
253	*A-1316-089-A	GA BOARD, COMPLETE (BVM-1316 ONLY)	254	263	$\Delta$ 1-532-203-11	FUSE, TIME-LAG 2A/250V (BVM-1416P ONLY)	
	*A-1316-090-A	GA BOARD, COMPLETE (BVM-1416P ONLY)	254		$\Delta$ 1-532-746-11	FUSE, GRASS TUBE 4A/125V (BVM-1316 ONLY)	
254	*1-627-679-11	GB BOARD		264	*4-393-031-01	COVER, FUSE HOLDER	
255	*4-347-706-00	HEAT SINK (TR)		265	$\Delta$ 1-580-375-11	INLET 3P	
256	4-379-410-01	SPACER (G2), POLISHING		266	*4-601-466-11	COVER, 3P INLET	
257	4-379-403-01	SPACER (G1), POLISHING		267	*4-379-430-01	PANEL, POWER	
258	*4-379-408-01	INSULATOR (G3)		268	*2-990-241-02	HOLDER (A), PLUG	
259	$\Delta$ 1-570-173-22	SWITCH, VOLTAGE CHANGE		269	1-533-168-21	HOLDER, FUSE	
260	*4-379-409-01	NUT, PLATE					

# SECTION 7 ELECTRICAL PARTS LIST

BA

NOTE:

The components identified by shading and mark **A** are critical for safety.

Replace only with part number specified.

Les composants identifiés par une trame et une marque **A** sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

• Items marked " \* " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

• All variable and adjustable resistors have characteristic curve B, unless otherwise noted.

RESISTORS

• All resistors are in ohms  
• F : nonflammable

When indicating parts by reference number, please include the board name.

CAPACITORS

COILS

• MF :  $\mu$ F, PF :  $\mu$ F

• MMH : mH, UH :  $\mu$ H

• The components identified by **A** in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation. Should replacement be required, replace only with the value originally used.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
	*A-1135-355-A	BA BOARD, COMPLETE *****		C35	1-126-966-11	ELECT 10MF 20%	16V
	*4-353-708-00	HOOK, FINGER		C36	1-126-966-11	ELECT 10MF 20%	16V
		<CONNECTOR>		C37	1-126-966-11	ELECT 10MF 20%	16V
BA1	*1-566-054-11	PIN, CONNECTOR 2P		C38	1-126-966-11	ELECT 10MF 20%	16V
BA2	*1-566-054-11	PIN, CONNECTOR 2P		C39	1-101-004-00	CERAMIC 0.01MF	50V
BA3	*1-566-054-11	PIN, CONNECTOR 2P		C51	1-126-103-11	ELECT 470MF 20%	16V
BA4	*1-566-054-11	PIN, CONNECTOR 2P		C52	1-126-101-11	ELECT 100MF 20%	16V
BA5	*1-566-054-11	PIN, CONNECTOR 2P		C53	1-126-101-11	ELECT 100MF 20%	16V
		<COMPOSITION CIRCUIT BLOCK>		C54	1-126-101-11	ELECT 100MF 20%	16V
BA6	*1-566-054-11	PIN, CONNECTOR 2P		C55	1-126-101-11	ELECT 100MF 20%	16V
C1	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C56	1-126-101-11	ELECT 100MF 20%	16V
C2	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C57	1-126-101-11	ELECT 100MF 20%	16V
C3	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C71	1-101-004-00	CERAMIC 0.01MF	50V
C4	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C72	1-101-004-00	CERAMIC 0.01MF	50V
C5	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C73	1-101-004-00	CERAMIC 0.01MF	50V
C6	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C74	1-101-004-00	CERAMIC 0.01MF	50V
C7	1-233-030-11	COMPOSITION CIRCUIT BLOCK		C75	1-101-004-00	CERAMIC 0.01MF	50V
		<CAPACITOR>		C76	1-101-004-00	CERAMIC 0.01MF	50V
C1	1-124-910-11	ELECT 47MF 20%	16V	C77	1-101-004-00	CERAMIC 0.01MF	50V
C2	1-124-910-11	ELECT 47MF 20%	16V	C101	1-102-038-00	CERAMIC 0.001MF	500V
C3	1-124-910-11	ELECT 47MF 20%	16V	C102	1-126-966-11	ELECT 10MF 20%	16V
C4	1-126-966-11	ELECT 10MF 20%	16V	C103	1-102-951-00	CERAMIC 15PF 5%	50V
C5	1-124-910-11	ELECT 47MF 20%	16V	C104	1-124-902-00	ELECT 0.47MF 20%	50V
C6	1-124-910-11	ELECT 47MF 20%	16V	C201	1-102-038-00	CERAMIC 0.001MF	500V
C7	1-124-910-11	ELECT 47MF 20%	16V	C202	1-126-966-11	ELECT 10MF 20%	16V
C8	1-124-910-11	ELECT 47MF 20%	16V	C203	1-102-951-00	CERAMIC 15PF 5%	50V
C9	1-101-004-00	CERAMIC 0.01MF	50V	C204	1-124-902-00	ELECT 0.47MF 20%	50V
C10	1-101-004-00	CERAMIC 0.01MF	50V	C301	1-102-038-00	CERAMIC 0.001MF	500V
C11	1-126-103-11	ELECT 470MF 20%	16V	C302	1-126-966-11	ELECT 10MF 20%	16V
C12	1-126-101-11	ELECT 100MF 20%	16V	C303	1-102-965-00	CERAMIC 39PF 5%	50V
C13	1-126-101-11	ELECT 100MF 20%	16V	C304	1-124-902-00	ELECT 0.47MF 20%	50V
C14	1-126-101-11	ELECT 100MF 20%	16V	C305	1-102-947-00	CERAMIC 10PF 0.5PF	50V
C15	1-126-101-11	ELECT 100MF 20%	16V	C306	1-102-942-00	CERAMIC 5PF 1PF	50V
C16	1-126-101-11	ELECT 100MF 20%	16V	C401	1-102-038-00	CERAMIC 0.001MF	500V
C17	1-126-101-11	ELECT 100MF 20%	16V	C402	1-126-966-11	ELECT 10MF 20%	16V
C18	1-126-966-11	ELECT 10MF 20%	16V	C403	1-102-951-00	CERAMIC 15PF 5%	50V
C19	1-126-966-11	ELECT 10MF 20%	16V	C404	1-124-902-00	ELECT 0.47MF 20%	50V
C20	1-101-004-00	CERAMIC 0.01MF	50V	C501	1-102-038-00	CERAMIC 0.001MF	500V
C21	1-101-006-00	CERAMIC 0.047MF	50V	C502	1-126-966-11	ELECT 10MF 20%	16V
C31	1-101-004-00	CERAMIC 0.01MF	50V	C503	1-102-951-00	CERAMIC 15PF 5%	50V
C32	1-126-966-11	ELECT 10MF 20%	16V	C504	1-124-902-00	ELECT 0.47MF 20%	50V
C33	1-126-966-11	ELECT 10MF 20%	16V	C601	1-102-038-00	CERAMIC 0.001MF	500V
C34	1-126-966-11	ELECT 10MF 20%	16V	C602	1-126-966-11	ELECT 10MF 20%	16V
				C603	1-102-951-00	CERAMIC 15PF 5%	50V
				C604	1-124-902-00	ELECT 0.47MF 20%	50V
				C701	1-102-976-00	CERAMIC 180PF 5%	50V
				C702	1-102-947-00	CERAMIC 10PF 0.5PF	50V
				C703	1-126-966-11	ELECT 10MF 20%	16V
				C704	1-124-910-11	ELECT 47MF 20%	16V
				C705	1-136-153-00	FILM 0.01MF 5%	50V
				C706	1-124-903-11	ELECT 1MF 20%	50V

BA

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
C707	1-123-369-00	ELECT 4.7MF	20% 25V	Q205	8-729-266-82	TRANSISTOR 2SC2668-0	
C708	1-126-966-11	ELECT 10MF	20% 16V	Q301	8-729-266-82	TRANSISTOR 2SC2668-0	
C709	1-102-973-00	CERAMIC 100PF	5% 50V	Q302	8-729-266-82	TRANSISTOR 2SC2668-0	
C710	1-130-481-00	MYLAR 0.0068MF	5% 50V	Q303	8-729-266-82	TRANSISTOR 2SC2668-0	
C711	1-136-155-00	FILM 0.015MF	5% 50V	Q304	8-729-384-48	TRANSISTOR 2SA844-E	
C712	1-130-471-00	MYLAR 0.001MF	5% 50V	Q305	8-729-266-82	TRANSISTOR 2SC2668-0	
C713	1-124-903-11	ELECT 1MF	20% 50V	Q401	8-729-266-82	TRANSISTOR 2SC2668-0	
C714	1-102-973-00	CERAMIC 100PF	5% 50V	Q402	8-729-266-82	TRANSISTOR 2SC2668-0	
C715	1-101-361-00	CERAMIC 150PF	5% 50V	Q403	8-729-266-82	TRANSISTOR 2SC2668-0	
C716	1-136-153-00	FILM 0.01MF	5% 50V	Q404	8-729-384-48	TRANSISTOR 2SA844-E	
C717	1-102-973-00	CERAMIC 100PF	5% 50V	Q405	8-729-266-82	TRANSISTOR 2SC2668-0	
<TRIMMER>				Q501	8-729-266-82	TRANSISTOR 2SC2668-0	
CV101	1-141-179-12	CAP. VAR. TRIMMER		Q502	8-729-266-82	TRANSISTOR 2SC2668-0	
CV102	1-141-260-00	TRIMAR. CERAMIC		Q503	8-729-266-82	TRANSISTOR 2SC2668-0	
CV201	1-141-179-12	CAP. VAR. TRIMMER		Q504	8-729-384-48	TRANSISTOR 2SA844-E	
CV202	1-141-260-00	TRIMAR. CERAMIC		Q505	8-729-266-82	TRANSISTOR 2SC2668-0	
CV401	1-141-179-12	CAP. VAR. TRIMMER		Q601	8-729-266-82	TRANSISTOR 2SC2668-0	
CV402	1-141-260-00	TRIMAR. CERAMIC		Q602	8-729-266-82	TRANSISTOR 2SC2668-0	
CV501	1-141-179-12	CAP. VAR. TRIMMER		Q603	8-729-266-82	TRANSISTOR 2SC2668-0	
CV502	1-141-260-00	TRIMAR. CERAMIC		Q604	8-729-384-48	TRANSISTOR 2SA844-E	
CV601	1-141-179-12	CAP. VAR. TRIMMER		Q605	8-729-266-82	TRANSISTOR 2SC2668-0	
CV602	1-141-260-00	TRIMAR. CERAMIC		Q701	8-729-119-76	TRANSISTOR 2SA1175-HFE	
<DIODE>				Q702	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D1	8-719-109-63	DIODE RD3.0ESB2		Q703	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D2	8-719-000-06	DIODE MC921		Q704	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D4	8-719-000-04	DIODE MC911		Q705	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D701	8-719-911-19	DIODE 1SS119		Q706	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D702	8-719-109-75	DIODE RD4.3ESB2		Q707	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D703	8-719-911-19	DIODE 1SS119		Q708	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D704	8-719-911-19	DIODE 1SS119		Q709	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D705	8-719-911-19	DIODE 1SS119		Q710	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D706	8-719-911-19	DIODE 1SS119		Q711	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D707	8-719-911-19	DIODE 1SS119		Q712	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D708	8-719-911-19	DIODE 1SS119		Q713	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D709	8-719-911-19	DIODE 1SS119		Q714	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D710	8-719-911-19	DIODE 1SS119		Q715	8-729-800-10	TRANSISTOR 2SC3068	
<IC>				Q716	8-729-119-78	TRANSISTOR 2SC2785-HFE	
IC1	8-759-208-94	IC CX-894		Q717	8-729-119-76	TRANSISTOR 2SA1175-HFE	
IC2	8-759-208-94	IC CX-894		<RESISTOR>			
IC3	8-759-140-53	IC UPD4053BC		R1	1-249-405-11	CARBON 100 5% 1/4W	
<TRANSISTOR>				R2	1-249-405-11	CARBON 100 5% 1/4W	
Q1	8-729-900-89	TRANSISTOR DTC144ES		R3	1-249-405-11	CARBON 100 5% 1/4W	
Q2	8-729-384-48	TRANSISTOR 2SA844-E		R4	1-249-437-11	CARBON 47K 5% 1/4W	
Q3	8-729-900-89	TRANSISTOR DTC144ES		R5	1-249-405-11	CARBON 100 5% 1/4W	
Q4	8-729-900-89	TRANSISTOR DTC144ES		R6	1-249-432-11	CARBON 18K 5% 1/4W	
Q5	8-729-900-89	TRANSISTOR DTC144ES		R7	1-249-434-11	CARBON 27K 5% 1/4W	
Q6	8-729-900-65	TRANSISTOR DTA144ES		R8	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q101	8-729-266-82	TRANSISTOR 2SC2668-0		R9	1-249-405-11	CARBON 100 5% 1/4W	
Q102	8-729-266-82	TRANSISTOR 2SC2668-0		R10	1-249-405-11	CARBON 100 5% 1/4W	
Q103	8-729-266-82	TRANSISTOR 2SC2668-0		R11	1-249-433-11	CARBON 22K 5% 1/4W	
Q104	8-729-384-48	TRANSISTOR 2SA844-E		R12	1-249-405-11	CARBON 100 5% 1/4W	
Q105	8-729-266-82	TRANSISTOR 2SC2668-0		R13	1-249-437-11	CARBON 47K 5% 1/4W	
Q201	8-729-266-82	TRANSISTOR 2SC2668-0		R14	1-249-429-11	CARBON 10K 5% 1/4W	
Q202	8-729-266-82	TRANSISTOR 2SC2668-0		R101	1-249-417-11	CARBON 1K 5% 1/4W	
Q203	8-729-266-82	TRANSISTOR 2SC2668-0		R102	1-249-418-11	CARBON 1.2K 5% 1/4W	
Q204	8-729-384-48	TRANSISTOR 2SA844-E		R103	1-249-425-11	CARBON 4.7K 5% 1/4W	
				R104	1-249-405-11	CARBON 100 5% 1/4W	
				R105	1-215-437-00	METAL 4.7K 1% 1/4W	
				R106	1-249-430-11	CARBON 12K 5% 1/4W	
				R107	1-249-433-11	CARBON 22K 5% 1/4W	
				R108	1-215-427-00	METAL 1.8K 1% 1/4W	
				R109	1-215-415-00	METAL 560 1% 1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R110	1-249-405-11	CARBON	100 5% 1/4W	R609	1-215-415-00	METAL	560 1% 1/4W
R111	1-215-431-00	METAL	2.7K 1% 1/4W	R610	1-249-405-11	CARBON	100 5% 1/4W
R112	1-249-421-11	CARBON	2.2K 5% 1/4W	R611	1-215-431-00	METAL	2.7K 1% 1/4W
R113	1-249-393-11	CARBON	10 5% 1/4W	R612	1-249-421-11	CARBON	2.2K 5% 1/4W
R201	1-249-417-11	CARBON	1K 5% 1/4W	R613	1-249-393-11	CARBON	10 5% 1/4W
R202	1-249-418-11	CARBON	1.2K 5% 1/4W	R701	1-249-433-11	CARBON	22K 5% 1/4W
R203	1-249-425-11	CARBON	4.7K 5% 1/4W	R702	1-249-438-11	CARBON	56K 5% 1/4W
R204	1-249-405-11	CARBON	100 5% 1/4W	R703	1-249-417-11	CARBON	1K 5% 1/4W
R205	1-215-437-00	METAL	4.7K 1% 1/4W	R704	1-249-417-11	CARBON	1K 5% 1/4W
R206	1-249-430-11	CARBON	12K 5% 1/4W	R705	1-249-424-11	CARBON	3.9K 5% 1/4W
R207	1-249-433-11	CARBON	22K 5% 1/4W	R706	1-249-417-11	CARBON	1K 5% 1/4W
R208	1-215-427-00	METAL	1.8K 1% 1/4W	R707	1-249-429-11	CARBON	10K 5% 1/4W
R209	1-215-415-00	METAL	560 1% 1/4W	R708	1-249-421-11	CARBON	2.2K 5% 1/4W
R210	1-249-405-11	CARBON	100 5% 1/4W	R709	1-249-419-11	CARBON	1.5K 5% 1/4W
R211	1-215-431-00	METAL	2.7K 1% 1/4W	R710	1-249-418-11	CARBON	1.2K 5% 1/4W
R212	1-249-421-11	CARBON	2.2K 5% 1/4W	R711	1-249-434-11	CARBON	27K 5% 1/4W
R213	1-249-393-11	CARBON	10 5% 1/4W	R712	1-249-433-11	CARBON	22K 5% 1/4W
R301	1-249-417-11	CARBON	1K 5% 1/4W	R713	1-249-422-11	CARBON	2.7K 5% 1/4W
R302	1-249-418-11	CARBON	1.2K 5% 1/4W	R714	1-249-427-11	CARBON	6.8K 5% 1/4W
R303	1-249-426-11	CARBON	5.6K 5% 1/4W	R715	1-249-433-11	CARBON	22K 5% 1/4W
R304	1-249-405-11	CARBON	100 5% 1/4W	R716	1-249-422-11	CARBON	2.7K 5% 1/4W
R305	1-249-426-11	CARBON	5.6K 5% 1/4W	R717	1-249-425-11	CARBON	4.7K 5% 1/4W
R306	1-249-430-11	CARBON	12K 5% 1/4W	R718	1-249-410-11	CARBON	270 5% 1/4W
R307	1-249-432-11	CARBON	18K 5% 1/4W	R719	1-249-414-11	CARBON	560 5% 1/4W
R308	1-249-421-11	CARBON	2.2K 5% 1/4W	R720	1-247-850-11	CARBON	6.2K 5% 1/4W
R309	1-249-417-11	CARBON	1K 5% 1/4W	R721	1-249-438-11	CARBON	56K 5% 1/4W
R310	1-249-405-11	CARBON	100 5% 1/4W	R722	1-249-441-11	CARBON	100K 5% 1/4W
R311	1-249-417-11	CARBON	1K 5% 1/4W	R723	1-249-437-11	CARBON	47K 5% 1/4W
R312	1-249-421-11	CARBON	2.2K 5% 1/4W	R724	1-249-429-11	CARBON	10K 5% 1/4W
R313	1-249-393-11	CARBON	10 5% 1/4W	R725	1-249-438-11	CARBON	56K 5% 1/4W
R401	1-249-417-11	CARBON	1K 5% 1/4W	R726	1-247-895-00	CARBON	470K 5% 1/4W
R402	1-249-418-11	CARBON	1.2K 5% 1/4W	R727	1-249-425-11	CARBON	4.7K 5% 1/4W
R403	1-249-425-11	CARBON	4.7K 5% 1/4W	R728	1-249-435-11	CARBON	33K 5% 1/4W
R404	1-249-405-11	CARBON	100 5% 1/4W	R729	1-249-423-11	CARBON	3.3K 5% 1/4W
R405	1-215-437-00	METAL	4.7K 1% 1/4W	R730	1-249-421-11	CARBON	2.2K 5% 1/4W
R406	1-249-430-11	CARBON	12K 5% 1/4W	R731	1-249-422-11	CARBON	2.7K 5% 1/4W
R407	1-249-433-11	CARBON	22K 5% 1/4W	R732	1-249-422-11	CARBON	2.7K 5% 1/4W
R408	1-215-427-00	METAL	1.8K 1% 1/4W	R733	1-249-421-11	CARBON	2.2K 5% 1/4W
R409	1-215-415-00	METAL	560 1% 1/4W	R734	1-249-421-11	CARBON	2.2K 5% 1/4W
R410	1-249-405-11	CARBON	100 5% 1/4W	R735	1-249-421-11	CARBON	2.2K 5% 1/4W
R411	1-215-431-00	METAL	2.7K 1% 1/4W	R736	1-249-425-11	CARBON	4.7K 5% 1/4W
R412	1-249-421-11	CARBON	2.2K 5% 1/4W	R737	1-249-405-11	CARBON	100 5% 1/4W
R413	1-249-393-11	CARBON	10 5% 1/4W	R738	1-249-441-11	CARBON	100K 5% 1/4W
R501	1-249-417-11	CARBON	1K 5% 1/4W	R739	1-249-433-11	CARBON	22K 5% 1/4W
R502	1-249-418-11	CARBON	1.2K 5% 1/4W	R740	1-249-417-11	CARBON	1K 5% 1/4W
R503	1-249-425-11	CARBON	4.7K 5% 1/4W	R741	1-202-473-00	SOLID	5.6M 5% 1/4W
R504	1-249-405-11	CARBON	100 5% 1/4W	R906	1-249-389-11	CARBON	4.7 5% 1/4W
R505	1-215-437-00	METAL	4.7K 1% 1/4W	R907	1-249-389-11	CARBON	4.7 5% 1/4W
R506	1-249-430-11	CARBON	12K 5% 1/4W				
R507	1-249-433-11	CARBON	22K 5% 1/4W				
R508	1-215-427-00	METAL	1.8K 1% 1/4W				
R509	1-215-415-00	METAL	560 1% 1/4W				
R510	1-249-405-11	CARBON	100 5% 1/4W				
R511	1-215-431-00	METAL	2.7K 1% 1/4W				
R512	1-249-421-11	CARBON	2.2K 5% 1/4W				
R513	1-249-393-11	CARBON	10 5% 1/4W				
R601	1-249-417-11	CARBON	1K 5% 1/4W				
R602	1-249-418-11	CARBON	1.2K 5% 1/4W				
R603	1-249-425-11	CARBON	4.7K 5% 1/4W				
R604	1-249-405-11	CARBON	100 5% 1/4W				
R605	1-215-437-00	METAL	4.7K 1% 1/4W				
R606	1-249-430-11	CARBON	12K 5% 1/4W				
R607	1-249-433-11	CARBON	22K 5% 1/4W				
R608	1-215-427-00	METAL	1.8K 1% 1/4W				

## &lt;VARIABLE RESISTOR&gt;

RV101 1-237-514-21 RES, ADJ, CERMET 500  
RV201 1-237-514-21 RES, ADJ, CERMET 500  
RV401 1-237-514-21 RES, ADJ, CERMET 500  
RV501 1-237-514-21 RES, ADJ, CERMET 500  
RV601 1-237-514-21 RES, ADJ, CERMET 500

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BC

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
	*A-1135-357-A	BC BOARD, COMPLETE (BVM-1316 ONLY) *****		C136	1-101-004-00	CERAMIC 0.01MF	50V
	*4-353-708-00	HOOK, FINGER		C137	1-101-004-00	CERAMIC 0.01MF	50V
		<CAPACITOR>		C138	1-101-004-00	CERAMIC 0.01MF	50V
C1	1-102-951-00	CERAMIC 15PF	5% 50V	C139	1-101-004-00	CERAMIC 0.01MF	50V
C2	1-102-951-00	CERAMIC 15PF	5% 50V	C143	1-101-004-00	CERAMIC 0.01MF	50V
C3	1-102-947-00	CERAMIC 10PF	0.5PF 50V				
C4	1-101-880-00	CERAMIC 47PF	5% 50V	C144	1-126-233-11	ELECT 22MF	20% 25V
C5	1-102-965-00	CERAMIC 39PF	5% 50V	C201	1-124-917-11	ELECT 33MF	20% 25V
				C202	1-101-004-00	CERAMIC 0.01MF	50V
C6	1-101-004-00	CERAMIC 0.01MF	50V			<TRIMMER>	
C7	1-102-935-00	CERAMIC 2PF	0.25PF 50V	CV1	1-141-171-00	CAP, TRIMMER 15P	
C8	1-101-361-00	CERAMIC 39PF	5% 50V	CV2	1-141-171-00	CAP, TRIMMER 15P	
C9	1-126-966-11	ELECT 10MF	20% 16V			<DIODE>	
C10	1-126-966-11	ELECT 10MF	20% 16V	D1	8-719-911-19	DIODE 1SS119	
C11	1-101-004-00	CERAMIC 0.01MF	50V	D2	8-719-920-95	DIODE 1T25-0	
C12	1-101-004-00	CERAMIC 0.01MF	50V	D3	8-719-911-19	DIODE 1SS119	
C13	1-101-004-00	CERAMIC 0.01MF	50V	D4	8-719-110-13	DIODE RD9.1ESB2	
C14	1-101-004-00	CERAMIC 0.01MF	50V	D5	8-719-911-19	DIODE 1SS119	
C15	1-124-910-11	ELECT 47MF	20% 16V	D6	8-719-911-19	DIODE 1SS119	
C16	1-124-910-11	ELECT 47MF	20% 16V	D7	8-719-911-19	DIODE 1SS119	
C17	1-124-034-51	ELECT 33MF	20% 16V			<IC>	
C18	1-101-004-00	CERAMIC 0.01MF	50V	IC1	8-759-204-21	IC TA7193P	
C19	1-102-953-00	CERAMIC 18PF	5% 50V	IC2	8-752-006-12	IC CX20061	
C20	1-102-951-00	CERAMIC 15PF	5% 50V	IC3	8-759-140-53	IC UPD4053BC	
C22	1-101-884-00	CERAMIC 56PF	5% 50V			<COIL>	
C23	1-123-369-00	ELECT 4.7MF	20% 25V	L1	1-408-533-00	COIL, VARIABLE	
C24	1-163-157-00	FILM 0.022MF	5% 50V	L2	1-408-513-00	COIL (VARIABLE)	
C25	1-163-157-00	FILM 0.022MF	5% 50V	L3	1-408-533-00	COIL, VARIABLE	
C26	1-101-004-00	CERAMIC 0.01MF	50V	L4	1-408-429-00	INDUCTOR 470UH	
C27	1-101-004-00	CERAMIC 0.01MF	50V	L5	1-408-429-00	INDUCTOR 470UH	
C28	1-124-902-00	ELECT 0.47MF	20% 50V	L6	1-408-429-00	INDUCTOR 470UH	
C29	1-101-004-00	CERAMIC 0.01MF	50V			<TRANSISTOR>	
C30	1-101-004-00	CERAMIC 0.01MF	50V	Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C31	1-124-119-00	ELECT 330MF	20% 16V	Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C34	1-109-676-00	MICA 130PF	1% 500V	Q3	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C35	1-109-631-00	MICA 330PF	1% 500V	Q4	8-729-800-10	TRANSISTOR 2SC3068	
C36	1-102-960-00	CERAMIC 24PF	5% 50V	Q5	8-729-800-10	TRANSISTOR 2SC3068	
C39	1-109-676-00	MICA 130PF	1% 500V	Q6	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C40	1-109-631-00	MICA 330PF	1% 500V	Q7	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C41	1-102-960-00	CERAMIC 24PF	5% 50V	Q8	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C42	1-101-004-00	CERAMIC 0.01MF	50V	Q9	8-729-384-48	TRANSISTOR 2SA844-E	
C50	1-102-942-00	CERAMIC 5PF	0.5PF 50V	Q10	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C101	1-124-034-51	ELECT 33MF	20% 16V	Q11	8-729-384-48	TRANSISTOR 2SA844-E	
C102	1-101-004-00	CERAMIC 0.01MF	50V	Q12	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C103	1-124-917-11	ELECT 33MF	20% 25V	Q13	8-729-384-48	TRANSISTOR 2SA844-E	
C104	1-124-034-51	ELECT 33MF	20% 16V	Q14	8-729-384-48	TRANSISTOR 2SA844-E	
C105	1-101-004-00	CERAMIC 0.01MF	50V	Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C106	1-124-917-11	ELECT 33MF	20% 25V	Q16	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C107	1-101-004-00	CERAMIC 0.01MF	50V	Q17	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C111	1-124-034-51	ELECT 33MF	20% 16V	Q18	8-729-800-10	TRANSISTOR 2SC3068	
C112	1-124-034-51	ELECT 33MF	20% 16V	Q19	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C113	1-124-034-51	ELECT 33MF	20% 16V	Q20	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C116	1-101-004-00	CERAMIC 0.01MF	50V	Q21	8-729-800-10	TRANSISTOR 2SC3068	
C117	1-101-004-00	CERAMIC 0.01MF	50V	Q101	8-729-140-97	TRANSISTOR 2SB734-34	
C118	1-101-004-00	CERAMIC 0.01MF	50V	Q103	8-729-900-63	TRANSISTOR DTA124ES	
C121	1-124-034-51	ELECT 33MF	20% 16V	Q104	8-729-900-63	TRANSISTOR DTA124ES	
C122	1-124-034-51	ELECT 33MF	20% 16V				
C123	1-124-034-51	ELECT 33MF	20% 16V				
C126	1-101-004-00	CERAMIC 0.01MF	50V				
C127	1-101-004-00	CERAMIC 0.01MF	50V				
C128	1-101-004-00	CERAMIC 0.01MF	50V				
C131	1-124-034-51	ELECT 33MF	20% 16V				
C132	1-124-034-51	ELECT 33MF	20% 16V				
C133	1-124-034-51	ELECT 33MF	20% 16V				



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<RESISTOR>							
R1	1-249-428-11	CARBON	8.2K 5% 1/4W	R65	1-215-421-00	METAL	1K 1% 1/4W
R2	1-249-429-11	CARBON	10K 5% 1/4W	R68	1-249-427-11	CARBON	6.8K 5% 1/4W
R3	1-249-405-11	CARBON	100 5% 1/4W	R69	1-215-420-00	METAL	910 1% 1/4W
R4	1-249-422-11	CARBON	2.7K 5% 1/4W	R70	1-215-420-00	METAL	910 1% 1/4W
R5	1-215-421-00	METAL	1K 1% 1/4W	R71	1-215-417-00	METAL	680 1% 1/4W
R6	1-215-398-00	METAL	110 1% 1/4W	R72	1-249-422-11	CARBON	2.7K 5% 1/4W
R7	1-249-405-11	CARBON	100 5% 1/4W	R73	1-249-405-11	CARBON	100 5% 1/4W
R8	1-215-421-00	METAL	1K 1% 1/4W	R74	1-215-421-00	METAL	1K 1% 1/4W
R9	1-215-421-00	METAL	1K 1% 1/4W	R77	1-249-427-11	CARBON	6.8K 5% 1/4W
R10	1-215-423-00	METAL	1.2K 1% 1/4W	R78	1-215-420-00	METAL	910 1% 1/4W
R11	1-249-405-11	CARBON	100 5% 1/4W	R79	1-215-420-00	METAL	910 1% 1/4W
R12	1-215-425-00	METAL	1.5K 1% 1/4W	R80	1-215-417-00	METAL	680 1% 1/4W
R13	1-215-425-00	METAL	1.5K 1% 1/4W	R81	1-249-422-11	CARBON	2.7K 5% 1/4W
R14	1-215-405-00	METAL	220 1% 1/4W	R82	1-249-405-11	CARBON	100 5% 1/4W
R15	1-249-405-11	CARBON	100 5% 1/4W	R83	1-215-481-00	METAL	330K 1% 1/4W
R16	1-249-433-11	CARBON	22K 5% 1/4W	R85	1-215-429-00	METAL	2.2K 1% 1/4W
R17	1-249-433-11	CARBON	22K 5% 1/4W	R86	1-215-415-00	METAL	560 1% 1/4W
R18	1-249-421-11	CARBON	2.2K 5% 1/4W	R87	1-215-477-00	METAL	220K 1% 1/4W
R19	1-249-425-11	CARBON	4.7K 5% 1/4W	R88	1-215-457-00	METAL	33K 1% 1/4W
R20	1-249-429-11	CARBON	10K 5% 1/4W	R90	1-249-429-11	CARBON	10K 5% 1/4W
R22	1-249-429-11	CARBON	10K 5% 1/4W	R91	1-249-433-11	CARBON	22K 5% 1/4W
R23	1-249-431-11	CARBON	15K 5% 1/4W	R95	1-249-429-11	CARBON	10K 5% 1/4W
R24	1-249-428-11	CARBON	8.2K 5% 1/4W	R96	1-249-433-11	CARBON	22K 5% 1/4W
R25	1-249-405-11	CARBON	100 5% 1/4W	R101	1-249-423-11	CARBON	3.3K 5% 1/4W
R26	1-249-417-11	CARBON	1K 5% 1/4W	R102	1-249-419-11	CARBON	1.5K 5% 1/4W
R27	1-249-405-11	CARBON	100 5% 1/4W	R103	1-249-427-11	CARBON	6.8K 5% 1/4W
R28	1-249-417-11	CARBON	1K 5% 1/4W	R104	1-249-422-11	CARBON	2.7K 5% 1/4W
R29	1-249-405-11	CARBON	100 5% 1/4W	R105	1-249-429-11	CARBON	10K 5% 1/4W
R30	1-249-425-11	CARBON	4.7K 5% 1/4W	R202	1-249-429-11	CARBON	10K 5% 1/4W
R31	1-249-425-11	CARBON	4.7K 5% 1/4W	<VARIABLE RESISTOR>			
R32	1-249-433-11	CARBON	22K 5% 1/4W	RV1	1-237-500-21	RES, ADJ, CERMET 1K	
R33	1-249-405-11	CARBON	100 5% 1/4W	RV2	1-237-504-21	RES, ADJ, CERMET 20K	
R34	1-215-425-00	METAL	1.5K 1% 1/4W	RV3	1-237-499-21	RES, ADJ, CERMET 500	
R35	1-215-425-00	METAL	1.5K 1% 1/4W	RV4	1-237-501-21	RES, ADJ, CERMET 2K	
R36	1-215-425-00	METAL	1.5K 1% 1/4W	RV5	1-237-501-21	RES, ADJ, CERMET 2K	
R37	1-215-425-00	METAL	1.5K 1% 1/4W	<CRYSTAL>			
R38	1-215-439-00	METAL	5.6K 1% 1/4W	X1	1-567-505-11	OSCILLATOR, CRYSTAL	
R39	1-215-469-00	METAL	100K 1% 1/4W	*****			
R40	1-247-903-00	CARBON	1M 5% 1/4W	*A-1135-391-A	BD BOARD, COMPLETE (BVM-1416P ONLY)		
R41	1-249-427-11	CARBON	6.8K 5% 1/4W	*****			
R42	1-249-420-11	CARBON	1.8K 5% 1/4W	*4-353-708-00	HOOK, FINGER		
R43	1-249-415-11	CARBON	680 5% 1/4W	<CAPACITOR>			
R44	1-249-418-11	CARBON	1.2K 5% 1/4W	C1	1-102-947-00	CERAMIC	10PF 0.5PF 50V
R45	1-249-422-11	CARBON	2.7K 5% 1/4W	C2	1-102-947-00	CERAMIC	10PF 0.5PF 50V
R47	1-249-413-11	CARBON	470 5% 1/4W	C3	1-102-963-00	CERAMIC	33PF 5% 50V
R49	1-249-413-11	CARBON	470 5% 1/4W	C4	1-101-880-00	CERAMIC	47PF 5% 50V
R50	1-249-405-11	CARBON	100 5% 1/4W	C6	1-101-888-00	CERAMIC	68PF 5% 50V
R51	1-215-417-00	METAL	680 1% 1/4W	C7	1-102-963-00	CERAMIC	33PF 5% 50V
R52	1-215-417-00	METAL	680 1% 1/4W	C8	1-102-943-00	CERAMIC	6PF 0.5PF 50V
R53	1-215-413-00	METAL	470 1% 1/4W	C9	1-126-966-11	ELECT	10MF 20% 16V
R54	1-215-443-00	METAL	8.2K 1% 1/4W	C10	1-126-966-11	ELECT	10MF 20% 16V
R55	1-249-421-11	CARBON	2.2K 5% 1/4W	C11	1-101-004-00	CERAMIC	0.01MF 50V
R56	1-249-441-11	CARBON	100K 5% 1/4W	C12	1-101-004-00	CERAMIC	0.01MF 50V
R57	1-249-417-11	CARBON	1K 5% 1/4W	C13	1-101-004-00	CERAMIC	0.01MF 50V
R58	1-249-417-11	CARBON	1K 5% 1/4W	C14	1-101-004-00	CERAMIC	0.01MF 50V
R59	1-249-429-11	CARBON	10K 5% 1/4W	C15	1-101-004-00	CERAMIC	0.01MF 50V
R60	1-249-433-11	CARBON	22K 5% 1/4W	C16	1-101-004-00	CERAMIC	0.01MF 50V
R61	1-249-420-11	CARBON	1.8K 5% 1/4W				
R62	1-249-429-11	CARBON	10K 5% 1/4W				
R63	1-249-425-11	CARBON	4.7K 5% 1/4W				
R64	1-249-429-11	CARBON	10K 5% 1/4W				

## 7. ELECTRICAL PARTS LIST

7-6

BD

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
<COIL>				R10	1-215-421-00	METAL 1K 1% 1/4W	
L1	1-408-533-00	COIL, VARIABLE		R11	1-215-391-00	METAL 56 1% 1/4W	
L2	1-408-532-00	COIL, VARIABLE		R12	1-215-427-00	METAL 1.8K 1% 1/4W	
L3	9-910-999-31	COIL (VARIABLE)		R13	1-249-425-11	CARBON 4.7K 5% 1/4W	
L4	1-408-421-00	INDUCTOR 100UH		R14	1-249-429-11	CARBON 10K 5% 1/4W	
L5	1-408-429-00	INDUCTOR 470UH		R15	1-249-429-11	CARBON 10K 5% 1/4W	
L6	1-408-429-00	INDUCTOR 470UH		R17	1-249-433-11	CARBON 22K 5% 1/4W	
L8	1-408-421-00	INDUCTOR 100UH		R18	1-215-425-00	METAL 1.5K 1% 1/4W	
L101	1-408-421-00	INDUCTOR 100UH		R19	1-215-425-00	METAL 1.5K 1% 1/4W	
L102	1-408-421-00	INDUCTOR 100UH		R20	1-215-425-00	METAL 1.5K 1% 1/4W	
<TRANSISTOR>				R21	1-215-425-00	METAL 1.5K 1% 1/4W	
Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE		R22	1-249-405-11	CARBON 100 5% 1/4W	
Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE		R23	1-215-441-00	METAL 6.8K 1% 1/4W	
Q3	8-729-119-78	TRANSISTOR 2SC2785-HFE		R24	1-215-469-00	METAL 100K 1% 1/4W	
Q4	8-729-800-10	TRANSISTOR 2SC3068		R25	1-249-427-11	CARBON 6.8K 5% 1/4W	
Q5	8-729-800-10	TRANSISTOR 2SC3068		R26	1-249-415-11	CARBON 680 5% 1/4W	
Q6	8-729-384-48	TRANSISTOR 2SA844-E		R27	1-249-415-11	CARBON 680 5% 1/4W	
Q7	8-729-119-78	TRANSISTOR 2SC2785-HFE		R28	1-249-420-11	CARBON 1.8K 5% 1/4W	
Q8	8-729-384-48	TRANSISTOR 2SA844-E		R29	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE		R30	1-249-405-11	CARBON 100 5% 1/4W	
Q10	8-729-119-76	TRANSISTOR 2SA1175-HFE		R31	1-247-903-00	CARBON 1M 5% 1/4W	
Q11	8-729-119-76	TRANSISTOR 2SA1175-HFE		R32	1-249-429-11	CARBON 10K 5% 1/4W	
Q12	8-729-119-78	TRANSISTOR 2SC2785-HFE		R34	1-215-407-00	METAL 270 1% 1/4W	
Q13	8-729-119-78	TRANSISTOR 2SC2785-HFE		R35	1-215-407-00	METAL 270 1% 1/4W	
Q14	8-729-119-78	TRANSISTOR 2SC2785-HFE		R36	1-215-413-00	METAL 470 1% 1/4W	
Q15	8-729-119-78	TRANSISTOR 2SC2785-HFE		R37	1-215-443-00	METAL 8.2K 1% 1/4W	
Q16	8-729-119-78	TRANSISTOR 2SC2785-HFE		R38	1-249-441-11	CARBON 100K 5% 1/4W	
Q17	8-729-119-78	TRANSISTOR 2SC2785-HFE		R39	1-215-425-00	METAL 1.5K 1% 1/4W	
Q18	8-729-600-19	TRANSISTOR 2SK381-A		R40	1-215-421-00	METAL 1K 1% 1/4W	
Q20	8-729-119-76	TRANSISTOR 2SA1175-HFE		R41	1-215-429-00	METAL 2.2K 1% 1/4W	
Q21	8-729-119-78	TRANSISTOR 2SC2785-HFE		R42	1-215-445-00	METAL 10K 1% 1/4W	
Q22	8-729-119-78	TRANSISTOR 2SC2785-HFE		R43	1-215-421-00	METAL 1K 1% 1/4W	
Q23	8-729-384-48	TRANSISTOR 2SA844-E		R44	1-249-433-11	CARBON 22K 5% 1/4W	
Q24	8-729-119-78	TRANSISTOR 2SC2785-HFE		R45	1-249-429-11	CARBON 10K 5% 1/4W	
Q25	8-729-800-10	TRANSISTOR 2SC3068		R46	1-249-429-11	CARBON 10K 5% 1/4W	
Q26	8-729-600-19	TRANSISTOR 2SK381-A		R47	1-249-441-11	CARBON 100K 5% 1/4W	
Q28	8-729-119-76	TRANSISTOR 2SA1175-HFE		R48	1-249-425-11	CARBON 4.7K 5% 1/4W	
Q29	8-729-119-78	TRANSISTOR 2SC2785-HFE		R54	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q30	8-729-119-78	TRANSISTOR 2SC2785-HFE		R55	1-215-418-00	METAL 750 1% 1/4W	
Q31	8-729-384-48	TRANSISTOR 2SA844-E		R56	1-215-420-00	METAL 910 1% 1/4W	
Q32	8-729-119-78	TRANSISTOR 2SC2785-HFE		R57	1-249-415-11	CARBON 680 5% 1/4W	
Q33	8-729-800-10	TRANSISTOR 2SC3068		R58	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q34	8-729-119-78	TRANSISTOR 2SC2785-HFE		R59	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q35	8-729-119-78	TRANSISTOR 2SC2785-HFE		R60	1-215-418-00	METAL 750 1% 1/4W	
Q36	8-729-119-78	TRANSISTOR 2SC2785-HFE		R61	1-215-420-00	METAL 910 1% 1/4W	
Q38	8-729-119-78	TRANSISTOR 2SC2785-HFE		R62	1-249-415-11	CARBON 680 5% 1/4W	
Q101	8-729-140-97	TRANSISTOR 2SB734-34		R63	1-249-422-11	CARBON 2.7K 5% 1/4W	
Q102	8-729-320-62	TRANSISTOR 2SD789-34		R64	1-215-477-00	METAL 220K 1% 1/4W	
Q103	8-729-900-63	TRANSISTOR DTA124ES		R65	1-215-435-00	METAL 3.9K 1% 1/4W	
Q104	8-729-900-63	TRANSISTOR DTA124ES		R66	1-249-405-11	CARBON 100 5% 1/4W	
<RESISTOR>				R70	1-247-903-00	CARBON 1M 5% 1/4W	
R1	1-249-428-11	CARBON 8.2K 5% 1/4W		R71	1-249-429-11	CARBON 10K 5% 1/4W	
R2	1-249-429-11	CARBON 10K 5% 1/4W		R72	1-249-429-11	CARBON 10K 5% 1/4W	
R3	1-249-422-11	CARBON 2.7K 5% 1/4W		R73	1-249-429-11	CARBON 10K 5% 1/4W	
R4	1-215-425-00	METAL 1.5K 1% 1/4W		R74	1-249-417-11	CARBON 1K 5% 1/4W	
R5	1-215-395-00	METAL 82 1% 1/4W		R75	1-249-427-11	CARBON 6.8K 5% 1/4W	
R6	1-215-421-00	METAL 1K 1% 1/4W		R76	1-249-427-11	CARBON 6.8K 5% 1/4W	
R7	1-215-421-00	METAL 1K 1% 1/4W		R77	1-249-425-11	CARBON 4.7K 5% 1/4W	
R8	1-215-423-00	METAL 1.2K 1% 1/4W		R78	1-215-424-00	METAL 1.3K 1% 1/4W	
R9	1-215-421-00	METAL 1K 1% 1/4W		R79	1-215-419-00	METAL 820 1% 1/4W	
				R80	1-215-425-00	METAL 1.5K 1% 1/4W	
				R81	1-249-422-11	CARBON 2.7K 5% 1/4W	
				R82	1-249-425-11	CARBON 4.7K 5% 1/4W	

7. ELECTRICAL PARTS LIST



## 7. ELECTRICAL PARTS LIST

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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
C141	1-101-004-00	CERAMIC 0.01MF	50V	IC6	8-759-140-53	IC UPD4053BC	
C142	1-101-004-00	CERAMIC 0.01MF	50V	IC7	8-759-503-91	IC TL082ACP	
C143	1-101-004-00	CERAMIC 0.01MF	50V				
C144	1-101-004-00	CERAMIC 0.01MF	50V			<COIL>	
C145	1-101-004-00	CERAMIC 0.01MF	50V				
C146	1-101-004-00	CERAMIC 0.01MF	50V	L2	1-408-408-00	INDUCTOR 8.2UH	
C147	1-101-004-00	CERAMIC 0.01MF	50V				
<COMPOSITION CIRCUIT BLOCK>				<TRANSISTOR>			
CP11	1-232-726-11	COMPOSITION CIRCUIT BLOCK		Q1	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP12	1-232-728-11	COMPOSITION CIRCUIT BLOCK		Q5	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP13	1-232-726-11	COMPOSITION CIRCUIT BLOCK		Q7	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP14	1-233-018-11	COMPOSITION CIRCUIT BLOCK		Q8	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP15	1-233-019-11	COMPOSITION CIRCUIT BLOCK		Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP16	1-233-031-11	COMPOSITION CIRCUIT BLOCK		Q10	8-729-384-48	TRANSISTOR 2SA844-E	
CP17	1-233-032-11	COMPOSITION CIRCUIT BLOCK		Q11	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP18	1-233-013-11	COMPOSITION CIRCUIT BLOCK		Q12	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP19	1-233-017-11	COMPOSITION CIRCUIT BLOCK		Q13	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP20	1-232-752-11	COMPOSITION CIRCUIT BLOCK		Q14	8-729-800-10	TRANSISTOR 2SC3068	
CP21	1-232-726-11	COMPOSITION CIRCUIT BLOCK		Q21	8-729-384-48	TRANSISTOR 2SA844-E	
CP22	1-232-728-11	COMPOSITION CIRCUIT BLOCK		Q22	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP23	1-232-726-11	COMPOSITION CIRCUIT BLOCK		Q23	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP25	1-232-730-11	COMPOSITION CIRCUIT BLOCK		Q24	8-729-600-19	TRANSISTOR 2SK381-A	
CP26	1-232-730-11	COMPOSITION CIRCUIT BLOCK		Q25	8-729-384-48	TRANSISTOR 2SA844-E	
CP27	1-231-765-00	COMPOSITION CIRCUIT BLOCK		Q26	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP28	1-232-752-11	COMPOSITION CIRCUIT BLOCK		Q27	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP29	1-232-728-11	COMPOSITION CIRCUIT BLOCK		Q28	8-729-600-19	TRANSISTOR 2SK381-A	
CP30	1-232-728-11	COMPOSITION CIRCUIT BLOCK		Q29	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP31	1-232-734-11	COMPOSITION CIRCUIT BLOCK		Q30	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP32	1-232-728-11	COMPOSITION CIRCUIT BLOCK		Q31	8-729-384-48	TRANSISTOR 2SA844-E	
CP33	1-232-738-11	COMPOSITION CIRCUIT BLOCK		Q32	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP41	1-233-014-11	COMPOSITION CIRCUIT BLOCK		Q33	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CP42	1-233-014-11	COMPOSITION CIRCUIT BLOCK		Q34	8-729-600-19	TRANSISTOR 2SK381-A	
				Q35	8-729-384-48	TRANSISTOR 2SA844-E	
<TRIMMER>				Q36	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CV2	1-141-181-11	CAP, TRIMMER		Q37	8-729-119-78	TRANSISTOR 2SC2785-HFE	
CV3	1-141-171-00	CAP, TRIMMER 20P		Q38	8-729-600-19	TRANSISTOR 2SK381-A	
<DIODE>				Q39	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D1	8-719-911-19	DIODE 1SS119		Q40	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D2	8-719-911-19	DIODE 1SS119					
D5	8-719-911-19	DIODE 1SS119		Q41	8-729-384-48	TRANSISTOR 2SA844-E	
D6	8-719-911-19	DIODE 1SS119		Q42	8-729-384-48	TRANSISTOR 2SA844-E	
D7	8-719-911-19	DIODE 1SS119		Q43	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D16	8-719-911-19	DIODE 1SS119		Q44	8-729-384-48	TRANSISTOR 2SA844-E	
D17	8-719-911-19	DIODE 1SS119		Q45	8-729-119-78	TRANSISTOR 2SC2785-HFE	
<DELAY LINE>				Q49	8-729-119-78	TRANSISTOR 2SC2785-HFE	
DL1	1-415-477-11	DELAY LINE		Q50	8-729-119-78	TRANSISTOR 2SC2785-HFE	
DL2	1-415-458-11	DELAY LINE		Q71	8-729-384-48	TRANSISTOR 2SA844-E	
DL3	1-406-769-11	DELAY LINE		Q72	8-729-119-78	TRANSISTOR 2SC2785-HFE	
DL4	1-406-769-11	DELAY LINE		Q73	8-729-119-78	TRANSISTOR 2SC2785-HFE	
<IC>				Q74	8-729-384-48	TRANSISTOR 2SA844-E	
IC1	8-759-800-81	IC LA7016		Q75	8-729-800-10	TRANSISTOR 2SC3068	
IC2	8-766-001-49	TRANSISTOR TX-429M		Q76	8-729-900-63	TRANSISTOR DTA124ES	
IC3	8-759-145-58	IC UPC4558C		Q77	8-729-900-63	TRANSISTOR DTA124ES	
IC4	8-757-182-14	IC CX-718D-1		Q81	8-729-384-48	TRANSISTOR 2SA844-E	
IC5	8-759-140-53	IC UPD4053BC		Q82	8-729-119-78	TRANSISTOR 2SC2785-HFE	
				Q83	8-729-119-78	TRANSISTOR 2SC2785-HFE	
				Q84	8-729-384-48	TRANSISTOR 2SA844-E	
				Q85	8-729-800-10	TRANSISTOR 2SC3068	
<RESISTOR>							
				R1	1-249-405-11	CARBON 100 5% 1/4W	
				R2	1-215-396-00	METAL 91 1% 1/4W	
				R3	1-215-431-00	METAL 2.7K 1% 1/4W	



7. ELECTRICAL PARTS LIST

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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<SWITCH>							
S1	1-570-857-11	SWITCH, SLIDE		C106	1-101-004-00	CERAMIC	0.01MF 50V
*****				C107	1-161-021-11	CERAMIC	0.047MF 10% 25V
*A-1135-359-A	BH BOARD, COMPLETE	*****		C108	1-101-004-00	CERAMIC	0.01MF 50V
*4-353-708-00	HOOK, FINGER			C109	1-101-004-00	CERAMIC	0.01MF 50V
<CAPACITOR>				C110	1-101-880-00	CERAMIC	47PF 5% 50V
C1	1-124-034-51	ELECT	33MF 20% 16V	C201	1-161-021-11	CERAMIC	0.047MF 10% 25V
C2	1-124-034-51	ELECT	33MF 20% 16V	C202	1-102-942-00	CERAMIC	5PF 0.5PF 50V
C3	1-124-034-51	ELECT	33MF 20% 16V	C203	1-102-959-00	CERAMIC	22PF 5% 50V
C4	1-124-034-51	ELECT	33MF 20% 16V	C204	1-126-966-11	ELECT	10MF 20% 16V
C5	1-124-034-51	ELECT	33MF 20% 16V	C205	1-161-021-11	CERAMIC	0.047MF 10% 25V
C6	1-124-034-51	ELECT	33MF 20% 16V	C206	1-101-004-00	CERAMIC	0.01MF 50V
C7	1-124-034-51	ELECT	33MF 20% 16V	C301	1-161-021-11	CERAMIC	0.047MF 10% 25V
C8	1-124-034-51	ELECT	33MF 20% 16V	C302	1-102-942-00	CERAMIC	5PF 0.5PF 50V
C9	1-124-034-51	ELECT	33MF 20% 16V	C303	1-102-959-00	CERAMIC	22PF 5% 50V
C10	1-124-034-51	ELECT	33MF 20% 16V	C304	1-126-966-11	ELECT	10MF 20% 16V
C11	1-124-034-51	ELECT	33MF 20% 16V	C305	1-161-021-11	CERAMIC	0.047MF 10% 25V
C12	1-124-034-51	ELECT	33MF 20% 16V	C306	1-101-004-00	CERAMIC	0.01MF 50V
C13	1-124-034-51	ELECT	33MF 20% 16V	C307	1-161-021-11	CERAMIC	0.047MF 10% 25V
C14	1-124-034-51	ELECT	33MF 20% 16V	C308	1-101-004-00	CERAMIC	0.01MF 50V
C15	1-101-004-00	CERAMIC	0.01MF 50V	C309	1-101-004-00	CERAMIC	0.01MF 50V
C16	1-101-004-00	CERAMIC	0.01MF 50V	<COMPOSITION CIRCUIT BLOCK>			
C17	1-101-004-00	CERAMIC	0.01MF 50V	CP1	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C18	1-101-004-00	CERAMIC	0.01MF 50V	CP2	1-232-727-11	COMPOSITION CIRCUIT BLOCK	
C20	1-123-382-00	ELECT	3.3MF 20% 50V	CP3	1-233-012-11	COMPOSITION CIRCUIT BLOCK	
C21	1-126-966-11	ELECT	10MF 20% 16V	CP5	1-233-012-11	COMPOSITION CIRCUIT BLOCK	
C22	1-126-966-11	ELECT	10MF 20% 16V	CP7	1-233-012-11	COMPOSITION CIRCUIT BLOCK	
C23	1-126-966-11	ELECT	10MF 20% 16V	CP9	1-232-735-11	COMPOSITION CIRCUIT BLOCK	
C24	1-126-966-11	ELECT	10MF 20% 16V	CP10	1-231-760-00	COMPOSITION CIRCUIT BLOCK	
C26	1-101-004-00	CERAMIC	0.01MF 50V	CP12	1-232-735-11	COMPOSITION CIRCUIT BLOCK	
C41	1-124-119-00	ELECT	330MF 20% 16V	CP13	1-231-760-00	COMPOSITION CIRCUIT BLOCK	
C42	1-124-119-00	ELECT	330MF 20% 16V	CP15	1-232-735-11	COMPOSITION CIRCUIT BLOCK	
C43	1-124-119-00	ELECT	330MF 20% 16V	CP16	1-232-749-11	COMPOSITION CIRCUIT BLOCK	
C44	1-126-966-11	ELECT	10MF 20% 16V	CP17	1-232-096-00	COMPOSITION CIRCUIT BLOCK	
C45	1-126-966-11	ELECT	10MF 20% 16V	CP18	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C50	1-126-966-11	ELECT	10MF 20% 16V	CP19	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C51	1-101-004-00	CERAMIC	0.01MF 50V	CP20	1-232-736-11	COMPOSITION CIRCUIT BLOCK	
C52	1-101-004-00	CERAMIC	0.01MF 50V	CP21	1-232-736-11	COMPOSITION CIRCUIT BLOCK	
C53	1-101-004-00	CERAMIC	0.01MF 50V	CP22	1-232-745-11	COMPOSITION CIRCUIT BLOCK	
C54	1-101-004-00	CERAMIC	0.01MF 50V	CP23	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C55	1-101-004-00	CERAMIC	0.01MF 50V	CP24	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C71	1-124-119-00	ELECT	330MF 20% 16V	CP25	1-233-144-11	COMPOSITION CIRCUIT BLOCK	
C72	1-124-119-00	ELECT	330MF 20% 16V	CP26	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C73	1-124-119-00	ELECT	330MF 20% 16V	CP27	1-232-177-00	COMPOSITION CIRCUIT BLOCK	
C74	1-126-966-11	ELECT	10MF 20% 16V	CP28	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C80	1-126-966-11	ELECT	10MF 20% 16V	CP29	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C81	1-101-004-00	CERAMIC	0.01MF 50V	CP30	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C82	1-101-004-00	CERAMIC	0.01MF 50V	CP31	1-233-011-11	COMPOSITION CIRCUIT BLOCK	
C83	1-101-004-00	CERAMIC	0.01MF 50V	CP32	1-232-737-11	COMPOSITION CIRCUIT BLOCK	
C84	1-101-004-00	CERAMIC	0.01MF 50V	CP33	1-231-938-00	COMPOSITION CIRCUIT BLOCK	
C85	1-101-004-00	CERAMIC	0.01MF 50V	CP101	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C86	1-101-004-00	CERAMIC	0.01MF 50V	CP102	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C101	1-161-021-11	CERAMIC	0.047MF 10% 25V	CP103	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C102	1-102-942-00	CERAMIC	5PF 0.5PF 50V	CP104	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C103	1-102-959-00	CERAMIC	22PF 5% 50V	CP201	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C104	1-126-966-11	ELECT	10MF 20% 16V	CP202	1-232-726-11	COMPOSITION CIRCUIT BLOCK	
C105	1-161-021-11	CERAMIC	0.047MF 10% 25V	CP203	1-232-726-11	COMPOSITION CIRCUIT BLOCK	



## 7. ELECTRICAL PARTS LIST

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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R114	1-215-445-00	METAL	10K 1% 1/4W	C7	1-126-233-11	ELECT	22MF 20% 25V
R115	1-215-445-00	METAL	10K 1% 1/4W	C8	1-123-369-00	ELECT	4.7MF 20% 25V
R116	1-249-429-11	CARBON	10K 5% 1/4W	C10	1-124-915-11	ELECT	10MF 20% 50V
R117	1-215-493-00	METAL	1M 1% 1/4W	C11	1-126-966-11	ELECT	10MF 20% 16V
R120	1-215-451-00	METAL	18K 1% 1/4W	C12	1-101-004-00	CERAMIC	0.01MF 50V
R121	1-215-453-00	METAL	22K 1% 1/4W	C13	1-101-004-00	CERAMIC	0.01MF 50V
R201	1-247-903-00	CARBON	1M 5% 1/4W	C14	1-101-004-00	CERAMIC	0.01MF 50V
R202	1-249-431-11	CARBON	15K 5% 1/4W	C15	1-126-233-11	ELECT	22MF 20% 16V
R203	1-249-419-11	CARBON	1.5K 5% 1/4W	C16	1-126-966-11	ELECT	10MF 20% 16V
R204	1-249-430-11	CARBON	12K 5% 1/4W	C17	1-101-004-00	CERAMIC	0.01MF 50V
R205	1-249-409-11	CARBON	220 5% 1/4W	C18	1-101-004-00	CERAMIC	0.01MF 50V
R206	1-249-419-11	CARBON	1.5K 5% 1/4W	C19	1-101-004-00	CERAMIC	0.01MF 50V
R207	1-215-425-00	METAL	1.5K 1% 1/4W	C41	1-124-034-51	ELECT	33MF 20% 16V
R208	1-249-415-11	CARBON	680 5% 1/4W	C42	1-124-034-51	ELECT	33MF 20% 16V
R209	1-249-419-11	CARBON	1.5K 5% 1/4W	C43	1-124-034-51	ELECT	33MF 20% 16V
R210	1-215-427-00	METAL	1.8K 1% 1/4W	C44	1-124-034-51	ELECT	33MF 20% 16V
R211	1-215-453-00	METAL	22K 1% 1/4W	C45	1-124-034-51	ELECT	33MF 20% 16V
R212	1-249-419-11	CARBON	1.5K 5% 1/4W	C46	1-124-034-51	ELECT	33MF 20% 16V
R213	1-249-405-11	CARBON	100 5% 1/4W	C51	1-101-004-00	CERAMIC	0.01MF 50V
R214	1-215-445-00	METAL	10K 1% 1/4W	C52	1-101-004-00	CERAMIC	0.01MF 50V
R215	1-215-445-00	METAL	10K 1% 1/4W	C53	1-101-004-00	CERAMIC	0.01MF 50V
R216	1-249-429-11	CARBON	10K 5% 1/4W	C54	1-101-004-00	CERAMIC	0.01MF 50V
R217	1-215-455-00	METAL	27K 1% 1/4W	C55	1-101-004-00	CERAMIC	0.01MF 50V
R301	1-247-903-00	CARBON	1M 5% 1/4W	C56	1-101-004-00	CERAMIC	0.01MF 50V
R302	1-249-431-11	CARBON	15K 5% 1/4W	C57	1-101-004-00	CERAMIC	0.01MF 50V
R303	1-249-419-11	CARBON	1.5K 5% 1/4W	C71	1-124-034-51	ELECT	33MF 20% 16V
R304	1-249-430-11	CARBON	12K 5% 1/4W	C72	1-124-034-51	ELECT	33MF 20% 16V
R305	1-249-409-11	CARBON	220 5% 1/4W	C73	1-124-034-51	ELECT	33MF 20% 16V
R306	1-249-419-11	CARBON	1.5K 5% 1/4W	C74	1-124-034-51	ELECT	33MF 20% 16V
R307	1-215-425-00	METAL	1.5K 1% 1/4W	C75	1-124-034-51	ELECT	33MF 20% 16V
R308	1-249-415-11	CARBON	680 5% 1/4W	C76	1-124-034-51	ELECT	33MF 20% 16V
R309	1-249-419-11	CARBON	1.5K 5% 1/4W	C81	1-101-004-00	CERAMIC	0.01MF 50V
R310	1-215-427-00	METAL	1.8K 1% 1/4W	C82	1-101-004-00	CERAMIC	0.01MF 50V
R311	1-215-453-00	METAL	22K 1% 1/4W	C83	1-101-004-00	CERAMIC	0.01MF 50V
R312	1-249-419-11	CARBON	1.5K 5% 1/4W	C84	1-101-004-00	CERAMIC	0.01MF 50V
R313	1-249-405-11	CARBON	100 5% 1/4W	C85	1-101-004-00	CERAMIC	0.01MF 50V
R314	1-215-445-00	METAL	10K 1% 1/4W	C86	1-101-004-00	CERAMIC	0.01MF 50V
R315	1-215-445-00	METAL	10K 1% 1/4W	C87	1-101-004-00	CERAMIC	0.01MF 50V
R316	1-249-429-11	CARBON	10K 5% 1/4W	C101	1-101-004-00	CERAMIC	0.01MF 50V
<VARIABLE RESISTOR>				C102	1-124-903-11	ELECT	1MF 20% 50V
RV1	1-237-505-21	RES, ADJ, CERMET 50K		C104	1-126-966-11	ELECT	10MF 20% 16V
RV2	1-237-505-21	RES, ADJ, CERMET 50K		C105	1-101-004-00	CERAMIC	0.01MF 50V
RV3	1-237-505-21	RES, ADJ, CERMET 50K		C106	1-136-161-00	FILM	0.047MF 5% 50V
<SWITCH>				C107	1-102-937-00	CERAMIC	4PF 0.25PF 50V
S1	1-570-857-11	SWITCH, SLIDE		C108	1-101-880-00	CERAMIC	47PF 5% 50V
S2	1-570-851-11	SWITCH, SLIDE		C109	1-136-161-00	FILM	0.047MF 5% 50V
*****				C110	1-136-161-00	FILM	0.047MF 5% 50V
*A-1135-522-A BI BOARD, COMPLETE				C114	1-102-951-00	CERAMIC	15PF 5% 50V
*****				C115	1-136-153-00	FILM	0.01MF 5% 50V
*4-353-708-00 HOOK, FINGER				C116	1-102-973-00	CERAMIC	100PF 5% 50V
<CAPACITOR>				C117	1-101-004-00	CERAMIC	0.01MF 50V
C1	1-130-481-00	MYLAR	0.0068MF 5% 50V	C118	1-101-004-00	CERAMIC	0.01MF 50V
C2	1-136-165-00	FILM	0.1NF 5% 50V	C119	1-102-953-00	CERAMIC	18PF 5% 50V
C3	1-123-369-00	ELECT	4.7MF 20% 25V	C120	1-102-973-00	CERAMIC	100PF 5% 50V
C4	1-123-369-00	ELECT	4.7MF 20% 25V	C122	1-102-961-00	CERAMIC	27PF 5% 50V
C5	1-102-973-00	CERAMIC	100PF 5% 50V	C201	1-101-004-00	CERAMIC	0.01MF 50V
				C202	1-124-903-11	ELECT	1MF 20% 50V
				C204	1-126-966-11	ELECT	10MF 20% 16V
				C205	1-101-004-00	CERAMIC	0.01MF 50V
				C206	1-136-161-00	FILM	0.047MF 5% 50V
				C207	1-102-937-00	CERAMIC	4PF 0.25PF 50V
				C208	1-101-880-00	CERAMIC	47PF 5% 50V
				C209	1-136-161-00	FILM	0.047MF 5% 50V
				C210	1-136-161-00	FILM	0.047MF 5% 50V



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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
C214	1-102-951-00	CERAMIC 15PF	5% 50V	D205	8-719-109-93	DIODE RD6.2ESB2	
C215	1-136-153-00	FILM 0.01MF	5% 50V	D301	8-719-911-19	DIODE 1SS119	
C216	1-102-973-00	CERAMIC 100PF	5% 50V	D302	8-719-016-42	DIODE MC932	
C217	1-101-004-00	CERAMIC 0.01MF	50V	D303	8-719-109-74	DIODE RD4.3ESB1	
C218	1-101-004-00	CERAMIC 0.01MF	50V				
C219	1-102-953-00	CERAMIC 18PF	5% 50V	D304	8-719-911-19	DIODE 1SS119	
C220	1-102-973-00	CERAMIC 100PF	5% 50V	D305	8-719-109-93	DIODE RD6.2ESB2	
C222	1-102-961-00	CERAMIC 27PF	5% 50V				
C301	1-101-004-00	CERAMIC 0.01MF	50V				
C302	1-124-903-11	ELECT 1MF	20% 50V				
C304	1-126-966-11	ELECT 10MF	20% 16V				
C305	1-101-004-00	CERAMIC 0.01MF	50V				
C306	1-136-161-00	FILM 0.047MF	5% 50V				
C307	1-102-937-00	CERAMIC 4PF	0.25PF 50V				
C308	1-101-880-00	CERAMIC 47PF	5% 50V				
C309	1-136-161-00	FILM 0.047MF	5% 50V				
C310	1-136-161-00	FILM 0.047MF	5% 50V				
C314	1-102-951-00	CERAMIC 15PF	5% 50V				
C315	1-136-153-00	FILM 0.01MF	5% 50V				
C316	1-102-973-00	CERAMIC 100PF	5% 50V				
C317	1-101-004-00	CERAMIC 0.01MF	50V				
C318	1-101-004-00	CERAMIC 0.01MF	50V				
C319	1-102-953-00	CERAMIC 18PF	5% 50V				
C320	1-102-973-00	CERAMIC 100PF	5% 50V				
C322	1-102-961-00	CERAMIC 27PF	5% 50V				
<COMPOSITION CIRCUIT BLOCK>				<IC>			
CP3	1-231-765-00	COMPOSITION CIRCUIT BLOCK		IC1	8-759-145-58	IC UPC4558C	
CP4	1-231-765-00	COMPOSITION CIRCUIT BLOCK		IC101	8-759-140-53	IC UPD4053BC	
CP5	1-231-765-00	COMPOSITION CIRCUIT BLOCK		IC102	8-766-001-49	TRANSISTOR TX-429M	
CP6	1-231-765-00	COMPOSITION CIRCUIT BLOCK		IC103	8-759-503-91	IC TL082ACP	
CP7	1-231-765-00	COMPOSITION CIRCUIT BLOCK		IC104	8-759-503-91	IC TL082ACP	
CP101	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC105	8-759-503-91	IC TL082ACP	
CP102	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC201	8-759-140-53	IC UPD4053BC	
CP103	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC202	8-766-001-49	TRANSISTOR TX-429M	
CP104	1-232-726-11	COMPOSITION CIRCUIT BLOCK		IC203	8-759-503-91	IC TL082ACP	
CP201	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC204	8-759-503-91	IC TL082ACP	
CP202	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC205	8-759-503-91	IC TL082ACP	
CP203	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC301	8-759-140-53	IC UPD4053BC	
CP204	1-232-726-11	COMPOSITION CIRCUIT BLOCK		IC302	8-766-001-49	TRANSISTOR TX-429M	
CP301	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC303	8-759-503-91	IC TL082ACP	
CP302	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC304	8-759-503-91	IC TL082ACP	
CP303	1-233-012-11	COMPOSITION CIRCUIT BLOCK		IC305	8-759-503-91	IC TL082ACP	
CP304	1-232-726-11	COMPOSITION CIRCUIT BLOCK					
<DIODE>				<TRANSISTOR>			
D1	8-719-911-19	DIODE 1SS119		Q1	8-729-900-74	TRANSISTOR DTC143TS	
D2	8-719-911-19	DIODE 1SS119		Q2	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D4	8-719-911-19	DIODE 1SS119		Q3	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D5	8-719-911-19	DIODE 1SS119		Q11	8-729-201-05	TRANSISTOR 2SC2878-B	
D6	8-719-110-31	DIODE RD12ESB2		Q12	8-729-201-05	TRANSISTOR 2SC2878-B	
D7	8-719-911-19	DIODE 1SS119		Q13	8-729-201-05	TRANSISTOR 2SC2878-B	
D8	8-719-911-19	DIODE 1SS119		Q14	8-729-201-05	TRANSISTOR 2SC2878-B	
D101	8-719-911-19	DIODE 1SS119		Q15	8-729-900-65	TRANSISTOR DTA144ES	
D102	8-719-016-42	DIODE MC932		Q101	8-729-384-48	TRANSISTOR 2SA844-E	
D103	8-719-109-74	DIODE RD4.3ESB1		Q102	8-729-384-48	TRANSISTOR 2SA844-E	
D104	8-719-911-19	DIODE 1SS119		Q103	8-729-384-48	TRANSISTOR 2SA844-E	
D105	8-719-109-93	DIODE RD6.2ESB2		Q105	8-729-600-19	TRANSISTOR 2SK381-A	
D201	8-719-911-19	DIODE 1SS119		Q106	8-729-384-48	TRANSISTOR 2SA844-E	
D202	8-719-016-42	DIODE MC932		Q107	8-729-266-82	TRANSISTOR 2SC2668-0	
D203	8-719-109-74	DIODE RD4.3ESB1		Q108	8-729-384-48	TRANSISTOR 2SA844-E	
D204	8-719-911-19	DIODE 1SS119		Q109	8-729-600-19	TRANSISTOR 2SK381-A	
				Q110	8-729-600-19	TRANSISTOR 2SK381-A	
				Q113	8-729-600-19	TRANSISTOR 2SK381-A	
				Q114	8-729-200-17	TRANSISTOR 2SA1091-0	
				Q201	8-729-384-48	TRANSISTOR 2SA844-E	
				Q202	8-729-384-48	TRANSISTOR 2SA844-E	
				Q203	8-729-384-48	TRANSISTOR 2SA844-E	
				Q205	8-729-600-19	TRANSISTOR 2SK381-A	
				Q206	8-729-384-48	TRANSISTOR 2SA844-E	
				Q207	8-729-266-82	TRANSISTOR 2SC2668-0	
				Q208	8-729-384-48	TRANSISTOR 2SA844-E	
				Q209	8-729-600-19	TRANSISTOR 2SK381-A	
				Q210	8-729-600-19	TRANSISTOR 2SK381-A	
				Q213	8-729-600-19	TRANSISTOR 2SK381-A	
				Q214	8-729-200-17	TRANSISTOR 2SA1091-0	
				Q301	8-729-384-48	TRANSISTOR 2SA844-E	
				Q302	8-729-384-48	TRANSISTOR 2SA844-E	
				Q303	8-729-384-48	TRANSISTOR 2SA844-E	
				Q305	8-729-600-19	TRANSISTOR 2SK381-A	
				Q306	8-729-384-48	TRANSISTOR 2SA844-E	



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
Q307	8-729-266-82	TRANSISTOR 2SC2668-0		R137	1-249-417-11	CARBON 1K 5% 1/4W	
Q308	8-729-384-48	TRANSISTOR 2SA844-E		R138	1-249-441-11	CARBON 100K 5% 1/4W	
Q309	8-729-600-19	TRANSISTOR 2SK381-A		R140	1-249-429-11	CARBON 10K 5% 1/4W	
Q310	8-729-600-19	TRANSISTOR 2SK381-A		R141	1-215-469-00	METAL 100K 1% 1/4W	
Q313	8-729-600-19	TRANSISTOR 2SK381-A		R142	1-215-459-00	METAL 39K 1% 1/4W	
Q314	8-729-200-17	TRANSISTOR 2SA1091-0		R143	1-215-488-00	METAL 620K 1% 1/4W	
<RESISTOR>				R144	1-249-434-11	CARBON 27K 5% 1/4W	
R1	1-247-903-00	CARBON 1M 5% 1/4W		R145	1-249-429-11	CARBON 10K 5% 1/4W	
R2	1-249-429-11	CARBON 10K 5% 1/4W		R146	1-249-429-11	CARBON 10K 5% 1/4W	
R3	1-215-493-00	METAL 1M 1% 1/4W		R147	1-249-405-11	CARBON 100 5% 1/4W	
R4	1-215-469-00	METAL 100K 1% 1/4W		R150	1-249-405-11	CARBON 100 5% 1/4W	
R5	1-249-435-11	CARBON 33K 5% 1/4W		R201	1-249-441-11	CARBON 100K 5% 1/4W	
R8	1-249-435-11	CARBON 33K 5% 1/4W		R202	1-249-421-11	CARBON 2.2K 5% 1/4W	
R9	1-249-424-11	CARBON 3.9K 5% 1/4W		R204	1-215-469-00	METAL 100K 1% 1/4W	
R10	1-249-425-11	CARBON 4.7K 5% 1/4W		R205	1-215-475-00	METAL 180K 1% 1/4W	
R11	1-249-435-11	CARBON 33K 5% 1/4W		R206	1-215-428-00	METAL 2K 1% 1/4W	
R12	1-249-429-11	CARBON 10K 5% 1/4W		R207	1-249-435-11	CARBON 33K 5% 1/4W	
R13	1-249-425-11	CARBON 4.7K 5% 1/4W		R208	1-249-430-11	CARBON 12K 5% 1/4W	
R14	1-249-435-11	CARBON 33K 5% 1/4W		R209	1-249-417-11	CARBON 1K 5% 1/4W	
R15	1-249-429-11	CARBON 10K 5% 1/4W		R210	1-249-441-11	CARBON 100K 5% 1/4W	
R23	1-249-417-11	CARBON 1K 5% 1/4W		R211	1-249-417-11	CARBON 1K 5% 1/4W	
R24	1-249-417-11	CARBON 1K 5% 1/4W		R213	1-247-903-00	CARBON 1M 5% 1/4W	
R25	1-249-417-11	CARBON 1K 5% 1/4W		R214	1-249-419-11	CARBON 1.5K 5% 1/4W	
R31	1-249-430-11	CARBON 12K 5% 1/4W		R215	1-249-419-11	CARBON 1.5K 5% 1/4W	
R32	1-249-436-11	CARBON 39K 5% 1/4W		R216	1-249-424-11	CARBON 3.9K 5% 1/4W	
R33	1-249-430-11	CARBON 12K 5% 1/4W		R217	1-249-419-11	CARBON 1.5K 5% 1/4W	
R51	1-249-417-11	CARBON 1K 5% 1/4W		R218	1-215-421-00	METAL 1K 1% 1/4W	
R52	1-249-417-11	CARBON 1K 5% 1/4W		R219	1-249-405-11	CARBON 100 5% 1/4W	
R53	1-249-417-11	CARBON 1K 5% 1/4W		R220	1-249-405-11	CARBON 100 5% 1/4W	
R54	1-249-431-11	CARBON 15K 5% 1/4W		R221	1-249-409-11	CARBON 220 5% 1/4W	
R55	1-249-437-11	CARBON 47K 5% 1/4W		R222	1-215-425-00	METAL 1.5K 1% 1/4W	
R56	1-249-431-11	CARBON 15K 5% 1/4W		R223	1-249-429-11	CARBON 10K 5% 1/4W	
R57	1-249-431-11	CARBON 15K 5% 1/4W		R224	1-249-429-11	CARBON 10K 5% 1/4W	
R58	1-249-439-11	CARBON 68K 5% 1/4W		R225	1-249-422-11	CARBON 2.7K 5% 1/4W	
R60	1-215-465-00	METAL 68K 1% 1/4W		R227	1-215-445-00	METAL 10K 1% 1/4W	
R61	1-215-445-00	METAL 10K 1% 1/4W		R228	1-215-445-00	METAL 10K 1% 1/4W	
R101	1-249-441-11	CARBON 100K 5% 1/4W		R236	1-215-477-00	METAL 220K 1% 1/4W	
R102	1-249-421-11	CARBON 2.2K 5% 1/4W		R237	1-249-417-11	CARBON 1K 5% 1/4W	
R104	1-215-469-00	METAL 100K 1% 1/4W		R238	1-249-441-11	CARBON 100K 5% 1/4W	
R105	1-215-475-00	METAL 180K 1% 1/4W		R240	1-249-429-11	CARBON 10K 5% 1/4W	
R106	1-215-428-00	METAL 2K 1% 1/4W		R241	1-215-469-00	METAL 100K 1% 1/4W	
R107	1-249-435-11	CARBON 33K 5% 1/4W		R242	1-215-459-00	METAL 39K 1% 1/4W	
R108	1-249-430-11	CARBON 12K 5% 1/4W		R243	1-215-488-00	METAL 620K 1% 1/4W	
R109	1-249-417-11	CARBON 1K 5% 1/4W		R244	1-249-434-11	CARBON 27K 5% 1/4W	
R110	1-249-441-11	CARBON 100K 5% 1/4W		R245	1-249-429-11	CARBON 10K 5% 1/4W	
R111	1-249-417-11	CARBON 1K 5% 1/4W		R246	1-249-429-11	CARBON 10K 5% 1/4W	
R113	1-247-903-00	CARBON 1M 5% 1/4W		R247	1-249-405-11	CARBON 100 5% 1/4W	
R114	1-249-419-11	CARBON 1.5K 5% 1/4W		R250	1-249-405-11	CARBON 100 5% 1/4W	
R115	1-249-419-11	CARBON 1.5K 5% 1/4W		R301	1-249-441-11	CARBON 100K 5% 1/4W	
R116	1-249-424-11	CARBON 3.9K 5% 1/4W		R302	1-249-421-11	CARBON 2.2K 5% 1/4W	
R117	1-249-419-11	CARBON 1.5K 5% 1/4W		R304	1-215-469-00	METAL 100K 1% 1/4W	
R118	1-215-421-00	METAL 1K 1% 1/4W		R305	1-215-475-00	METAL 180K 1% 1/4W	
R119	1-249-405-11	CARBON 100 5% 1/4W		R306	1-215-428-00	METAL 2K 1% 1/4W	
R120	1-249-405-11	CARBON 100 5% 1/4W		R307	1-249-435-11	CARBON 33K 5% 1/4W	
R121	1-249-409-11	CARBON 220 5% 1/4W		R308	1-249-430-11	CARBON 12K 5% 1/4W	
R122	1-215-425-00	METAL 1.5K 1% 1/4W		R309	1-249-417-11	CARBON 1K 5% 1/4W	
R123	1-249-429-11	CARBON 10K 5% 1/4W		R310	1-249-441-11	CARBON 100K 5% 1/4W	
R124	1-249-429-11	CARBON 10K 5% 1/4W		R311	1-249-417-11	CARBON 1K 5% 1/4W	
R125	1-249-422-11	CARBON 2.7K 5% 1/4W		R312	1-249-417-11	CARBON 1K 5% 1/4W	
R127	1-215-445-00	METAL 10K 1% 1/4W		R313	1-247-903-00	CARBON 1M 5% 1/4W	
R128	1-215-445-00	METAL 10K 1% 1/4W		R314	1-249-419-11	CARBON 1.5K 5% 1/4W	
R136	1-215-477-00	METAL 220K 1% 1/4W		R315	1-249-419-11	CARBON 1.5K 5% 1/4W	
				R316	1-249-424-11	CARBON 3.9K 5% 1/4W	



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REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R317	1-249-419-11	CARBON	1.5K 5% 1/4W	C61	1-101-888-00	CERAMIC	68PF 5% 50V
R318	1-215-421-00	METAL	1K 1% 1/4W	C62	1-101-880-00	CERAMIC	47PF 5% 50V
R319	1-249-405-11	CARBON	100 5% 1/4W	C63	1-101-888-00	CERAMIC	68PF 5% 50V
R320	1-249-405-11	CARBON	100 5% 1/4W	C64	1-101-880-00	CERAMIC	47PF 5% 50V
R321	1-249-409-11	CARBON	220 5% 1/4W	C65	1-102-820-00	CERAMIC	330PF 5% 50V
R322	1-215-425-00	METAL	1.5K 1% 1/4W	C66	1-101-004-00	CERAMIC	0.01MF 50V
R323	1-249-429-11	CARBON	10K 5% 1/4W	C67	1-101-880-00	CERAMIC	47PF 5% 50V
R324	1-249-429-11	CARBON	10K 5% 1/4W	C100	1-124-910-11	ELECT	47MF 20% 16V
R325	1-249-422-11	CARBON	2.7K 5% 1/4W	C102	1-124-034-51	ELECT	33MF 20% 16V
R327	1-215-445-00	METAL	10K 1% 1/4W	C106	1-101-004-00	CERAMIC	0.01MF 50V
R328	1-215-445-00	METAL	10K 1% 1/4W	C108	1-124-034-51	ELECT	33MF 20% 16V
R336	1-215-477-00	METAL	220K 1% 1/4W	C109	1-101-004-00	CERAMIC	0.01MF 50V
R337	1-249-417-11	CARBON	1K 5% 1/4W	C110	1-101-004-00	CERAMIC	0.01MF 50V
R338	1-249-441-11	CARBON	100K 5% 1/4W	C111	1-101-004-00	CERAMIC	0.01MF 50V
R340	1-249-429-11	CARBON	10K 5% 1/4W	C112	1-101-004-00	CERAMIC	0.01MF 50V
R341	1-215-469-00	METAL	100K 1% 1/4W	C113	1-101-004-00	CERAMIC	0.01MF 50V
R342	1-215-459-00	METAL	39K 1% 1/4W	C114	1-126-966-11	ELECT	10MF 20% 16V
R343	1-215-488-00	METAL	620K 1% 1/4W	C115	1-101-004-00	CERAMIC	0.01MF 50V
R344	1-249-434-11	CARBON	27K 5% 1/4W	C116	1-101-004-00	CERAMIC	0.01MF 50V
R345	1-249-429-11	CARBON	10K 5% 1/4W	C117	1-101-004-00	CERAMIC	0.01MF 50V
R346	1-249-429-11	CARBON	10K 5% 1/4W	C118	1-126-966-11	ELECT	10MF 20% 16V
R347	1-249-405-11	CARBON	100 5% 1/4W	C120	1-101-004-00	CERAMIC	0.01MF 50V
R350	1-249-405-11	CARBON	100 5% 1/4W	C121	1-101-004-00	CERAMIC	0.01MF 50V
*****				C122	1-101-004-00	CERAMIC	0.01MF 50V
*A-1135-361-A BJ BOARD, COMPLETE				C130	1-124-034-51	ELECT	33MF 20% 16V
*****				<COMPOSITION CIRCUIT BLOCK>			
*4-353-708-00 HOOK, FINGER				CP1	1-232-738-11	COMPOSITION CIRCUIT BLOCK	
<CAPACITOR>				CP2	1-232-738-11	COMPOSITION CIRCUIT BLOCK	
C1	1-101-361-00	CERAMIC	150PF 5% 50V	CP3	1-232-738-11	COMPOSITION CIRCUIT BLOCK	
C2	1-101-361-00	CERAMIC	150PF 5% 50V	CP4	1-232-738-11	COMPOSITION CIRCUIT BLOCK	
C4	1-102-821-00	CERAMIC	360PF 5% 50V	CP5	1-232-738-11	COMPOSITION CIRCUIT BLOCK	
C5	1-130-473-00	MYLAR	0.0015MF 5% 50V	<DIODE>			
C11	1-104-302-11	POLYSTYRENE	0.001MF 5% 50V	D1	8-719-911-19	DIODE 1SS119	
C12	1-102-525-11	CERAMIC	68PF 5% 50V	D2	8-719-911-19	DIODE 1SS119	
C14	1-102-525-11	CERAMIC	68PF 5% 50V	D3	8-719-911-19	DIODE 1SS119	
C15	1-102-525-11	CERAMIC	68PF 5% 50V	D7	8-719-911-19	DIODE 1SS119	
C16	1-102-525-11	CERAMIC	68PF 5% 50V	D8	8-719-911-19	DIODE 1SS119	
C17	1-102-525-11	CERAMIC	68PF 5% 50V	D9	8-719-911-19	DIODE 1SS119	
C18	1-104-302-11	POLYSTYRENE	0.001MF 5% 50V	D11	8-719-016-42	DIODE MC932	
C19	1-102-973-00	CERAMIC	100PF 5% 50V	<IC>			
C20	1-102-525-11	CERAMIC	68PF 5% 50V	IC1	8-759-345-38	IC HD14538BP	
C21	1-101-361-00	CERAMIC	150PF 5% 50V	IC2	8-759-040-01	IC MC14001BCP	
C22	1-101-890-00	CERAMIC	75PF 5% 50V	IC3	8-759-240-40	IC TC4040BP	
C23	1-102-965-00	CERAMIC	39PF 5% 50V	IC4	8-759-240-40	IC TC4040BP	
C25	1-102-946-00	CERAMIC	9PF 1PF 50V	IC5	8-759-000-35	IC MC14027BCP	
C26	1-102-944-00	CERAMIC	7PF 1PF 50V	IC6	8-759-000-35	IC MC14027BCP	
C27	1-101-361-00	CERAMIC	150PF 5% 50V	IC7	8-759-000-35	IC MC14027BCP	
C28	1-130-471-00	MYLAR	0.001MF 5% 50V	IC8	8-759-000-35	IC MC14027BCP	
C29	1-130-471-00	MYLAR	0.001MF 5% 50V	IC9	8-759-000-35	IC MC14027BCP	
C30	1-101-004-00	CERAMIC	0.01MF 50V	IC10	8-759-345-38	IC HD14538BP	
C31	1-101-361-00	CERAMIC	150PF 5% 50V	IC11	8-759-345-38	IC HD14538BP	
C32	1-101-361-00	CERAMIC	150PF 5% 50V	IC12	8-759-345-38	IC HD14538BP	
C33	1-101-361-00	CERAMIC	150PF 5% 50V	IC13	8-759-040-01	IC MC14001BCP	
C34	1-101-361-00	CERAMIC	150PF 5% 50V	IC14	8-759-040-01	IC MC14001BCP	
C35	1-130-471-00	MYLAR	0.001MF 5% 50V	IC15	8-759-240-71	IC TC4071BP	
C36	1-102-824-00	CERAMIC	470PF 5% 50V	IC16	8-759-140-11	IC UPD4011BC	
C37	1-124-903-11	ELECT	1MF 20% 50V	IC17	8-759-140-11	IC UPD4011BC	
C38	1-101-004-00	CERAMIC	0.01MF 50V	IC18	8-759-000-32	IC MC14023BCP	
C39	1-101-004-00	CERAMIC	0.01MF 50V				
C40	1-102-074-00	CERAMIC	0.001MF 10% 50V				



**BJ BK**

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
<SWITCH>				C302	1-102-973-00	CERAMIC 100PF	5% 50V
S1	1-570-857-11	SWITCH, SLIDE		C303	1-124-341-00	ELECT 1MF	20% 200V
*****				C306	1-102-038-00	CERAMIC 0.001MF	500V
*A-1135-523-A	BK BOARD, COMPLETE			C307	1-102-038-00	CERAMIC 0.001MF	500V
*****				C309	1-124-478-11	ELECT 100MF	20% 25V
*4-353-770-00	HEAT SINK (TYPE 220)			C310	1-101-004-00	CERAMIC 0.01MF	50V
<CONNECTOR>				C311	1-124-482-11	ELECT 33MF	20% 25V
BK1	*1-566-056-11	PIN, CONNECTOR 4P		C312	1-101-004-00	CERAMIC 0.01MF	50V
BK2	*1-566-056-11	PIN, CONNECTOR 4P		C313	1-124-482-11	ELECT 33MF	20% 25V
BK3	*1-566-056-11	PIN, CONNECTOR 4P		C314	1-102-050-00	CERAMIC 0.01MF	99% 500V
BK4	*1-566-055-11	PIN, CONNECTOR 3P		C315	1-123-939-00	ELECT 10MF	20% 200V
BK5	*1-566-057-11	PIN, CONNECTOR 5P		C316	1-102-038-00	CERAMIC 0.001MF	500V
BK6	*1-566-043-11	PIN, CONNECTOR 4P		<TRIMMER>			
BK7	*1-566-043-11	PIN, CONNECTOR 4P		CV101	1-141-171-00	CAP, TRIMMER 15P	
BK8	*1-566-043-11	PIN, CONNECTOR 4P		CV201	1-141-171-00	CAP, TRIMMER 15P	
BK9	*1-566-054-11	PIN, CONNECTOR 2P		CV301	1-141-171-00	CAP, TRIMMER 15P	
BK10	*1-566-054-11	PIN, CONNECTOR 2P		<DIODE>			
BK11	*1-566-054-11	PIN, CONNECTOR 2P		D1	8-719-911-19	DIODE 1SS119	
BK12	*1-566-056-11	PIN, CONNECTOR 4P		D2	8-719-911-19	DIODE 1SS119	
BK13	*1-566-054-11	PIN, CONNECTOR 2P		D12	8-719-901-83	DIODE 1SS83	
<CAPACITOR>				D13	8-719-901-83	DIODE 1SS83	
C1	1-124-482-11	ELECT 33MF	20% 25V	D14	8-719-901-83	DIODE 1SS83	
C5	1-124-482-11	ELECT 33MF	20% 25V	D15	8-719-110-53	DIODE RD20ESB2	
C6	1-101-004-00	CERAMIC 0.01MF	50V	D20	8-719-911-19	DIODE 1SS119	
C11	1-124-482-11	ELECT 33MF	20% 25V	D21	8-719-911-19	DIODE 1SS119	
C12	1-101-001-00	CERAMIC 0.001MF	50V	D22	8-719-911-19	DIODE 1SS119	
C15	1-123-939-00	ELECT 10MF	20% 200V	D23	8-719-911-19	DIODE 1SS119	
C16	1-102-050-00	CERAMIC 0.01MF	99% 500V	D30	8-719-911-19	DIODE 1SS119	
C20	1-124-482-11	ELECT 33MF	20% 25V	D101	8-719-901-83	DIODE 1SS83	
C21	1-123-939-00	ELECT 10MF	20% 200V	D102	8-719-901-83	DIODE 1SS83	
C25	1-108-704-11	MYLAR 0.1MF	10% 200V	D103	8-719-911-19	DIODE 1SS119	
C31	1-136-153-00	FILM 0.01MF	5% 50V	D104	8-719-911-19	DIODE 1SS119	
C101	1-102-525-11	CERAMIC 68PF	5% 50V	D105	8-719-911-19	DIODE 1SS119	
C102	1-102-973-00	CERAMIC 100PF	5% 50V	D201	8-719-901-83	DIODE 1SS83	
C103	1-124-341-00	ELECT 1MF	20% 200V	D202	8-719-901-83	DIODE 1SS83	
C106	1-102-038-00	CERAMIC 0.001MF	500V	D203	8-719-911-19	DIODE 1SS119	
C107	1-102-038-00	CERAMIC 0.001MF	500V	D204	8-719-911-19	DIODE 1SS119	
C109	1-124-478-11	ELECT 100MF	20% 25V	D205	8-719-911-19	DIODE 1SS119	
C110	1-101-004-00	CERAMIC 0.01MF	50V	D301	8-719-901-83	DIODE 1SS83	
C111	1-124-482-11	ELECT 33MF	20% 25V	D302	8-719-901-83	DIODE 1SS83	
C112	1-101-004-00	CERAMIC 0.01MF	50V	D303	8-719-911-19	DIODE 1SS119	
C113	1-124-482-11	ELECT 33MF	20% 25V	D304	8-719-911-19	DIODE 1SS119	
C114	1-102-050-00	CERAMIC 0.01MF	99% 500V	D305	8-719-911-19	DIODE 1SS119	
C115	1-123-939-00	ELECT 10MF	20% 200V	<IC>			
C201	1-102-525-11	CERAMIC 68PF	5% 50V	IC1	8-759-145-58	IC UPC4558C	
C202	1-102-973-00	CERAMIC 100PF	5% 50V	<COIL>			
C203	1-124-341-00	ELECT 1MF	20% 200V	L101	1-408-413-00	INDUCTOR 22UH	
C206	1-102-038-00	CERAMIC 0.001MF	500V	L201	1-408-413-00	INDUCTOR 22UH	
C207	1-102-038-00	CERAMIC 0.001MF	500V	L301	1-408-413-00	INDUCTOR 22UH	
C209	1-124-478-11	ELECT 100MF	20% 25V	<TRANSISTOR>			
C210	1-101-004-00	CERAMIC 0.01MF	50V	Q1	8-729-119-76	TRANSISTOR 2SA1175-HFE	
C211	1-124-482-11	ELECT 33MF	20% 25V	Q2	8-729-119-76	TRANSISTOR 2SA1175-HFE	
C212	1-101-004-00	CERAMIC 0.01MF	50V	Q10	8-729-119-78	TRANSISTOR 2SC2785-HFE	
C213	1-124-482-11	ELECT 33MF	20% 25V	Q11	8-729-200-17	TRANSISTOR 2SA1091-0	
C214	1-102-050-00	CERAMIC 0.01MF	99% 500V				
C215	1-123-939-00	ELECT 10MF	20% 200V				
C301	1-102-525-11	CERAMIC 68PF	5% 50V				



BK

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
Q12	8-729-255-12	TRANSISTOR 2SC2551-0		R27	1-216-461-00	METAL OXIDE 5.6K 5%	2W F
Q20	8-729-119-80	TRANSISTOR 2SC2688-LK		R31	1-247-874-11	CARBON 62K 5%	1/4W
Q21	8-729-800-10	TRANSISTOR 2SC3068		R32	1-249-440-11	CARBON 82K 5%	1/4W
Q22	8-729-119-80	TRANSISTOR 2SC2688-LK		R33	1-249-430-11	CARBON 12K 5%	1/4W
Q23	8-729-306-92	TRANSISTOR 2SD669A-C		R34	1-249-429-11	CARBON 10K 5%	1/4W
Q23H	*4-363-146-00	HEAT SINK, V.OUT		R35	1-249-417-11	CARBON 1K 5%	1/4W
Q23S	4-370-970-01	SPACER, TR		R37	1-249-415-11	CARBON 680 5%	1/4W
Q30	8-729-119-80	TRANSISTOR 2SC2688-LK		R38	1-249-441-11	CARBON 100K 5%	1/4W
Q101	8-729-119-78	TRANSISTOR 2SC2785-HFE		R100	1-249-405-11	CARBON 100 5%	1/4W
Q102	8-729-119-76	TRANSISTOR 2SA1175-HFE		R101	1-215-409-00	METAL 330 1%	1/4W
Q103	8-729-384-48	TRANSISTOR 2SA844-E		R102	1-249-419-11	CARBON 1.5K 5%	1/4W
Q104	8-729-200-17	TRANSISTOR 2SA1091-0		R103	1-215-435-00	METAL 3.9K 1%	1/4W
Q105	8-729-822-47	TRANSISTOR 2SC3955-E		R104	1-249-422-11	CARBON 2.7K 5%	1/4W
Q105H	*4-363-146-00	HEAT SINK, V.OUT		R105	1-249-405-11	CARBON 100 5%	1/4W
Q105S	4-370-970-01	SPACER, TR		R106	1-215-412-00	METAL 430 1%	1/4W
Q106	8-729-802-71	TRANSISTOR 2SA1407-D		R107	1-215-467-00	METAL 82K 1%	1/4W
Q106S	4-370-970-01	SPACER, TR		R108	1-215-467-00	METAL 82K 1%	1/4W
Q107	8-729-802-71	TRANSISTOR 2SA1407-D		R109	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
Q107S	4-370-970-01	SPACER, TR		R110	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
Q201	8-729-119-78	TRANSISTOR 2SC2785-HFE		R111	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
Q202	8-729-119-76	TRANSISTOR 2SA1175-HFE		R112	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
Q203	8-729-384-48	TRANSISTOR 2SA844-E		R113	1-249-405-11	CARBON 100 5%	1/4W
Q204	8-729-200-17	TRANSISTOR 2SA1091-0		R114	1-215-401-11	METAL 150 1%	1/4W
Q205	8-729-822-47	TRANSISTOR 2SC3955-E		R115	1-215-865-11	METAL OXIDE 220 5%	1W F
Q205H	*4-363-146-00	HEAT SINK, V.OUT		R116	1-215-439-00	METAL 5.6K 1%	1/4W
Q205S	4-370-970-01	SPACER, TR		R117	1-215-481-00	METAL 330K 1%	1/4W
Q206	8-729-802-71	TRANSISTOR 2SA1407-D		R119	1-249-431-11	CARBON 15K 5%	1/4W
Q206S	4-370-970-01	SPACER, TR		R120	1-249-405-11	CARBON 100 5%	1/4W
Q207	8-729-802-71	TRANSISTOR 2SA1407-D		R124	1-249-423-11	CARBON 3.3K 5%	1/4W
Q207S	4-370-970-01	SPACER, TR		R125	1-247-834-11	CARBON 1.3K 5%	1/4W
Q301	8-729-119-78	TRANSISTOR 2SC2785-HFE		R126	1-249-429-11	CARBON 10K 5%	1/4W
Q302	8-729-119-76	TRANSISTOR 2SA1175-HFE		R127	1-249-417-11	CARBON 1K 5%	1/4W
Q303	8-729-384-48	TRANSISTOR 2SA844-E		R130	1-249-405-11	CARBON 100 5%	1/4W
Q304	8-729-200-17	TRANSISTOR 2SA1091-0		R200	1-249-405-11	CARBON 100 5%	1/4W
Q305	8-729-822-47	TRANSISTOR 2SC3955-E		R201	1-215-409-00	METAL 330 1%	1/4W
Q305H	*4-363-146-00	HEAT SINK, V.OUT		R202	1-249-419-11	CARBON 1.5K 5%	1/4W
Q305S	4-370-970-01	SPACER, TR		R203	1-215-435-00	METAL 3.9K 1%	1/4W
Q306	8-729-802-71	TRANSISTOR 2SA1407-D		R204	1-249-422-11	CARBON 2.7K 5%	1/4W
Q306S	4-370-970-01	SPACER, TR		R205	1-249-405-11	CARBON 100 5%	1/4W
Q307	8-729-802-71	TRANSISTOR 2SA1407-D		R206	1-215-412-00	METAL 430 1%	1/4W
Q307S	4-370-970-01	SPACER, TR		R207	1-215-467-00	METAL 82K 1%	1/4W
<RESISTOR>				R208	1-215-467-00	METAL 82K 1%	1/4W
R1	1-249-431-11	CARBON 15K 5%	1/4W	R209	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
R2	1-249-435-11	CARBON 33K 5%	1/4W	R210	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
R3	1-249-422-11	CARBON 2.7K 5%	1/4W	R211	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
R4	1-249-419-11	CARBON 1.5K 5%	1/4W	R212	1-216-457-00	METAL OXIDE 1.2K 5%	2W F
R5	1-249-431-11	CARBON 15K 5%	1/4W	R213	1-249-405-11	CARBON 100 5%	1/4W
R6	1-249-425-11	CARBON 4.7K 5%	1/4W	R214	1-215-401-11	METAL 150 1%	1/4W
R10	1-249-417-11	CARBON 1K 5%	1/4W	R215	1-215-865-11	METAL OXIDE 220 5%	1W F
R11	1-249-431-11	CARBON 15K 5%	1/4W	R216	1-215-439-00	METAL 5.6K 1%	1/4W
R12	1-249-437-11	CARBON 47K 5%	1/4W	R217	1-215-481-00	METAL 330K 1%	1/4W
R13	1-249-423-11	CARBON 3.3K 5%	1/4W	R219	1-249-431-11	CARBON 15K 5%	1/4W
R14	1-249-431-11	CARBON 15K 5%	1/4W	R220	1-249-405-11	CARBON 100 5%	1/4W
R16	1-215-901-00	METAL OXIDE 33K 5%	2W F	R224	1-249-423-11	CARBON 3.3K 5%	1/4W
R17	1-215-901-00	METAL OXIDE 33K 5%	2W F	R225	1-247-834-11	CARBON 1.3K 5%	1/4W
R20	1-216-461-00	METAL OXIDE 5.6K 5%	2W F	R226	1-249-429-11	CARBON 10K 5%	1/4W
R21	1-215-471-00	METAL 120K 1%	1/4W	R227	1-249-417-11	CARBON 1K 5%	1/4W
R22	1-215-470-00	METAL 110K 1%	1/4W	R230	1-249-405-11	CARBON 100 5%	1/4W
R23	1-215-445-00	METAL 10K 1%	1/4W	R300	1-249-405-11	CARBON 100 5%	1/4W
R24	1-215-439-00	METAL 5.6K 1%	1/4W	R301	1-215-409-00	METAL 330 1%	1/4W
R25	1-215-445-00	METAL 10K 1%	1/4W	R302	1-249-419-11	CARBON 1.5K 5%	1/4W
R26	1-215-445-00	METAL 10K 1%	1/4W	R303	1-215-435-00	METAL 3.9K 1%	1/4W
				R304	1-249-422-11	CARBON 2.7K 5%	1/4W

7. ELECTRICAL PARTS LIST

BK BT

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
R305	1-249-405-11	CARBON 100 5%	1/4W	C49	1-163-097-00	CERAMIC CHIP 15PF 5%	50V
R306	1-215-412-00	METAL 430 1%	1/4W	C50	1-124-907-11	ELECT 10MF 20%	50V
R307	1-215-467-00	METAL 82K 1%	1/4W	C51	1-123-875-11	ELECT 10MF 20%	50V
R308	1-215-467-00	METAL 82K 1%	1/4W	C52	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R309	1-216-457-00	METAL OXIDE 1.2K 5%	2W F	C53	1-123-875-11	ELECT 10MF 20%	50V
R310	1-216-457-00	METAL OXIDE 1.2K 5%	2W F	C54	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R311	1-216-457-00	METAL OXIDE 1.2K 5%	2W F	C55	1-123-875-11	ELECT 10MF 20%	50V
R312	1-216-457-00	METAL OXIDE 1.2K 5%	2W F	C56	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R313	1-249-405-11	CARBON 100 5%	1/4W	C60	1-124-478-11	ELECT 100MF 20%	25V
R314	1-215-401-11	METAL 150 1%	1/4W	C61	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R315	1-215-865-11	METAL OXIDE 220 5%	1W F	C62	1-124-907-11	ELECT 10MF 20%	50V
R316	1-215-439-00	METAL 5.6K 1%	1/4W	C63	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R317	1-215-481-00	METAL 330K 1%	1/4W	C64	1-124-477-11	ELECT 47MF 20%	16V
R319	1-249-431-11	CARBON 15K 5%	1/4W	C65	1-124-907-11	ELECT 10MF 20%	50V
R320	1-249-405-11	CARBON 100 5%	1/4W	C66	1-124-907-11	ELECT 10MF 20%	50V
R324	1-249-423-11	CARBON 3.3K 5%	1/4W	C67	1-124-907-11	ELECT 10MF 20%	50V
R325	1-247-834-11	CARBON 1.3K 5%	1/4W	C68	1-124-907-11	ELECT 10MF 20%	50V
R326	1-249-429-11	CARBON 10K 5%	1/4W	C69	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R327	1-249-417-11	CARBON 1K 5%	1/4W	C70	1-163-038-00	CERAMIC CHIP 0.1MF	25V
R330	1-249-405-11	CARBON 100 5%	1/4W	C71	1-163-038-00	CERAMIC CHIP 0.1MF	25V
				C72	1-163-038-00	CERAMIC CHIP 0.1MF	25V
<VARIABLE RESISTOR>				C73	1-163-038-00	CERAMIC CHIP 0.1MF	25V
RV101	1-237-515-21	RES, ADJ, CERMET 1K		C74	1-163-038-00	CERAMIC CHIP 0.1MF	25V
RV201	1-237-515-21	RES, ADJ, CERMET 1K		C75	1-163-038-00	CERAMIC CHIP 0.1MF	25V
RV301	1-237-515-21	RES, ADJ, CERMET 1K		C76	1-163-038-00	CERAMIC CHIP 0.1MF	25V
*****				C77	1-163-038-00	CERAMIC CHIP 0.1MF	25V
*A-1135-606-B BT BOARD, COMPLETE (BVM-1316 ONLY)				C78	1-163-038-00	CERAMIC CHIP 0.1MF	25V
*****				C79	1-163-038-00	CERAMIC CHIP 0.1MF	25V
*4-353-708-00 HOOK, FINGER				C80	1-163-038-00	CERAMIC CHIP 0.1MF	25V
<CAPACITOR>				C81	1-123-875-11	ELECT 10MF 20%	50V
C1	1-124-477-11	ELECT 47MF 20%	16V	C82	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C3	1-124-477-11	ELECT 47MF 20%	16V	C83	1-123-875-11	ELECT 10MF 20%	50V
C4	1-124-477-11	ELECT 47MF 20%	16V	C84	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C5	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C85	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C6	1-124-477-11	ELECT 47MF 20%	16V	C86	1-123-875-11	ELECT 10MF 20%	50V
C9	1-163-369-11	CERAMIC CHIP 47PF 5%	50V	C87	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C10	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C88	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C14	1-163-101-00	CERAMIC CHIP 22PF 5%	50V	C89	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C15	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C90	1-124-907-11	ELECT 10MF 20%	50V
C16	1-163-227-11	CERAMIC CHIP 10PF 0.5PF	50V	C100	1-124-478-11	ELECT 100MF 20%	25V
C17	1-163-093-00	CERAMIC CHIP 10PF 5%	50V	C101	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C18	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C102	1-124-907-11	ELECT 10MF 20%	50V
C19	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C103	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C20	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C104	1-124-477-11	ELECT 47MF 20%	16V
C21	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C105	1-124-907-11	ELECT 10MF 20%	50V
C22	1-163-099-00	CERAMIC CHIP 18PF 5%	50V	C106	1-124-907-11	ELECT 10MF 20%	50V
C23	1-163-097-00	CERAMIC CHIP 15PF 5%	50V	C107	1-124-907-11	ELECT 10MF 20%	50V
C30	1-163-251-11	CERAMIC CHIP 100PF 5%	50V	C108	1-124-907-11	ELECT 10MF 20%	50V
C32	1-163-235-11	CERAMIC CHIP 22PF 5%	50V	C109	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C34	1-163-099-00	CERAMIC CHIP 18PF 5%	50V	C110	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C37	1-163-235-11	CERAMIC CHIP 22PF 5%	50V	C111	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C38	1-163-222-11	CERAMIC CHIP 5PF 0.25PF	50V	C112	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C40	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C113	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C42	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C114	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C43	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C115	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C44	1-163-113-00	CERAMIC CHIP 68PF 5%	50V	C116	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C45	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C117	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C47	1-163-038-00	CERAMIC CHIP 0.1MF	25V	C118	1-163-038-00	CERAMIC CHIP 0.1MF	25V
C48	1-124-907-11	ELECT 10MF 20%	50V	C119	1-163-038-00	CERAMIC CHIP 0.1MF	25V
				C331	1-135-091-00	TANTAL. CHIP 1MF	20%
				C332	1-135-092-21	TANTAL. CHIP 3.3MF	20%
				C333	1-135-092-21	TANTAL. CHIP 3.3MF	20%
				C334	1-135-092-21	TANTAL. CHIP 3.3MF	20%

BT

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
C335	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	D8	8-719-104-34	DIODE 1S2836
C336	1-163-038-00	CERAMIC CHIP 0.1MF		25V	D9	8-719-104-34	DIODE 1S2836
C337	1-163-038-00	CERAMIC CHIP 0.1MF		25V	D331	8-719-400-18	DIODE MA152WK
C338	1-163-038-00	CERAMIC CHIP 0.1MF		25V			
C339	1-163-038-00	CERAMIC CHIP 0.1MF		25V	D341	8-719-400-18	DIODE MA152WK
					D361	8-719-400-18	DIODE MA152WK
C341	1-135-091-00	TANTAL. CHIP 1MF	20%	16V	<DELAY LINE>		
C342	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	DL1	1-415-348-21	DELAY LINE
C343	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	DL2	1-415-477-11	DELAY LINE
C344	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	DL3	1-415-700-11	DELAY LINE
C345	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	DL4	1-415-654-12	DELAY LINE
					DL5	1-415-700-11	DELAY LINE
C346	1-163-038-00	CERAMIC CHIP 0.1MF		25V	DL6	1-415-700-11	DELAY LINE
C347	1-163-038-00	CERAMIC CHIP 0.1MF		25V	DL7	1-415-348-21	DELAY LINE
C348	1-163-038-00	CERAMIC CHIP 0.1MF		25V	DL8	1-415-700-11	DELAY LINE
C349	1-163-038-00	CERAMIC CHIP 0.1MF		25V	DL9	1-415-727-11	DELAY LINE
C361	1-135-091-00	TANTAL. CHIP 1MF	20%	16V	<FILTER>		
C362	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	FL1	1-236-562-11	FILTER, LOW PASS
C363	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	FL2	1-236-561-11	FILTER, LOW PASS
C364	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	FL3	1-236-732-11	FILTER, LOW PASS
C365	1-135-092-21	TANTAL. CHIP 3.3MF	20%	16V	<IC>		
C366	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC1	8-759-800-81	IC LA7016
					IC2	8-759-800-81	IC LA7016
C367	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC3	8-759-701-78	IC NJM7809FA
C368	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC4	8-759-701-75	IC NJM7805FA
C369	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC331	8-752-334-78	IC CXL1009P-1
C501	1-163-038-00	CERAMIC CHIP 0.1MF		25V			
C502	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC341	8-752-334-78	IC CXL1009P-1
					IC361	8-752-330-14	IC CXL1009P
C503	1-163-038-00	CERAMIC CHIP 0.1MF		25V	IC501	8-752-053-68	IC CXA1539P
C504	1-163-038-00	CERAMIC CHIP 0.1MF		25V	<IC SOCKET>		
C505	1-163-038-00	CERAMIC CHIP 0.1MF		25V	ICS331*1-526-656-00	SOCKET, IC (DP) 20P	
C506	1-163-038-00	CERAMIC CHIP 0.1MF		25V	ICS341*1-526-656-00	SOCKET, IC (DP) 20P	
C507	1-163-038-00	CERAMIC CHIP 0.1MF		25V	ICS361*1-526-656-00	SOCKET, IC (DP) 20P	
					ICS501*1-526-659-00	SOCKET, IC (DP) 28P	
C508	1-163-038-00	CERAMIC CHIP 0.1MF		25V	<JUMPER>		
C509	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW1	1-216-295-00	METAL GLAZE 0 5% 1/10W
C510	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW2	1-216-295-00	METAL GLAZE 0 5% 1/10W
C511	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW3	1-216-295-00	METAL GLAZE 0 5% 1/10W
C512	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW5	1-216-295-00	METAL GLAZE 0 5% 1/10W
					JW11	1-216-295-00	METAL GLAZE 0 5% 1/10W
C513	1-163-038-00	CERAMIC CHIP 0.1MF		25V			
C514	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW12	1-216-295-00	METAL GLAZE 0 5% 1/10W
C515	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW13	1-216-295-00	METAL GLAZE 0 5% 1/10W
C516	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW14	1-216-295-00	METAL GLAZE 0 5% 1/10W
C517	1-163-038-00	CERAMIC CHIP 0.1MF		25V	JW15	1-216-295-00	METAL GLAZE 0 5% 1/10W
					<COIL>		
C518	1-163-038-00	CERAMIC CHIP 0.1MF		25V	L1	1-410-196-11	INDUCTOR CHIP 2.2UH
C519	1-163-038-00	CERAMIC CHIP 0.1MF		25V	L2	1-410-200-31	INDUCTOR CHIP 4.7UH
C520	1-163-038-00	CERAMIC CHIP 0.1MF		25V	L3	1-410-192-51	INDUCTOR CHIP 1UH
C521	1-163-038-00	CERAMIC CHIP 0.1MF		25V	L4	1-216-296-00	METAL GLAZE 0 5% 1/8W
C522	1-163-038-00	CERAMIC CHIP 0.1MF		25V	L5	1-216-296-00	METAL GLAZE 0 5% 1/8W
					L6	1-410-196-11	INDUCTOR CHIP 2.2UH
					L7	1-410-470-11	INDUCTOR 10UH
					L8	1-410-470-11	INDUCTOR 10UH
					L9	1-410-204-41	INDUCTOR CHIP 10UH
<TRIMMER>							
CV1	1-141-304-21	TRIMMER, CERAMIC					
CV2	1-141-304-21	TRIMMER, CERAMIC					
CV3	1-141-304-21	TRIMMER, CERAMIC					
CV4	1-141-304-21	TRIMMER, CERAMIC					
CV5	1-141-304-21	TRIMMER, CERAMIC					
CV6	1-141-304-21	TRIMMER, CERAMIC					
<DIODE>							
D1	8-719-104-34	DIODE 1S2836					
D2	8-719-105-91	DIODE RD5.6W-B2					
D3	8-719-400-18	DIODE MA152WK					
D4	8-719-400-18	DIODE MA152WK					
D5	8-719-400-18	DIODE MA152WK					
D6	8-719-104-34	DIODE 1S2836					
D7	8-719-400-18	DIODE MA152WK					

7. ELECTRICAL PARTS LIST

BT

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
L10	1-408-419-00	INDUCTOR 68UH		Q83	8-729-901-06	TRANSISTOR DTA144EK	
L11	1-410-200-31	INDUCTOR CHIP 4.7UH		Q84	8-729-901-06	TRANSISTOR DTA144EK	
L12	1-410-200-31	INDUCTOR CHIP 4.7UH		Q85	8-729-140-97	TRANSISTOR 2SB734-34	
L13	1-410-196-11	INDUCTOR CHIP 2.2UH		Q86	8-729-140-96	TRANSISTOR 2SD774-34	
L14	1-410-204-41	INDUCTOR CHIP 10UH					
L15	1-410-216-31	INDUCTOR CHIP 100UH					
		<TRANSISTOR>				<RESISTOR>	
Q1	8-729-216-22	TRANSISTOR 2SA1162-G		R1	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q2	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R2	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q3	8-729-122-63	TRANSISTOR 2SA1226-E4		R3	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q4	8-729-175-72	TRANSISTOR 2SC2757-T33		R4	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q5	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R5	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q6	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R6	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q7	8-729-122-63	TRANSISTOR 2SA1226-E4		R7	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
Q8	8-729-216-22	TRANSISTOR 2SA1162-G		R8	1-216-643-11	METAL CHIP 470 0.50% 1/10W	
Q9	8-729-122-63	TRANSISTOR 2SA1226-E4		R9	1-216-661-11	METAL CHIP 2.7K 0.50% 1/10W	
Q10	8-729-175-72	TRANSISTOR 2SC2757-T33		R10	1-216-643-11	METAL CHIP 470 0.50% 1/10W	
Q11	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R11	1-216-661-11	METAL CHIP 2.7K 0.50% 1/10W	
Q12	8-729-122-63	TRANSISTOR 2SA1226-E4		R12	1-216-675-11	METAL CHIP 10K 0.50% 1/10W	
Q13	8-729-175-72	TRANSISTOR 2SC2757-T33		R13	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
Q14	8-729-175-72	TRANSISTOR 2SC2757-T33		R14	1-216-663-11	METAL CHIP 3.3K 0.50% 1/10W	
Q15	8-729-216-22	TRANSISTOR 2SA1162-G		R15	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q16	8-729-107-46	TRANSISTOR 2SC3624A-L15		R16	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q17	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R17	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
Q18	8-729-216-22	TRANSISTOR 2SA1162-G		R18	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q19	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R19	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q20	8-729-175-72	TRANSISTOR 2SC2757-T33		R20	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q21	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R21	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q22	8-729-120-28	TRANSISTOR 2SA1226-E4		R22	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
Q23	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R23	1-216-635-11	METAL CHIP 220 0.50% 1/10W	
Q24	8-729-216-22	TRANSISTOR 2SA1162-G		R24	1-216-635-11	METAL CHIP 220 0.50% 1/10W	
Q25	8-729-107-46	TRANSISTOR 2SC3624A-L15		R25	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
Q32	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R26	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
Q33	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R27	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
Q34	8-729-216-22	TRANSISTOR 2SA1162-G		R28	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q35	8-729-216-22	TRANSISTOR 2SA1162-G		R29	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
Q36	8-729-122-63	TRANSISTOR 2SA1226-E4		R30	1-216-651-11	METAL CHIP 1K 0.50% 1/10W	
Q37	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R31	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q38	8-729-122-63	TRANSISTOR 2SA1226-E4		R33	1-216-665-11	METAL CHIP 3.9K 0.50% 1/10W	
Q39	8-729-175-72	TRANSISTOR 2SC2757-T33		R34	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
Q40	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R35	1-216-651-11	METAL CHIP 1K 0.50% 1/10W	
Q41	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R36	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
Q42	8-729-216-22	TRANSISTOR 2SA1162-G		R37	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q43	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R38	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
Q44	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R39	1-216-635-11	METAL CHIP 220 0.50% 1/10W	
Q45	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R40	1-216-630-11	METAL CHIP 130 0.50% 1/10W	
Q52	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R41	1-216-630-11	METAL CHIP 130 0.50% 1/10W	
Q54	8-729-216-22	TRANSISTOR 2SA1162-G		R42	1-216-635-11	METAL CHIP 220 0.50% 1/10W	
Q56	8-729-122-63	TRANSISTOR 2SA1226-E4		R43	1-216-067-00	METAL GLAZE 5.6K 5% 1/10W	
Q57	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R44	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
Q58	8-729-122-63	TRANSISTOR 2SA1226-E4		R45	1-216-651-11	METAL CHIP 1K 0.50% 1/10W	
Q59	8-729-175-72	TRANSISTOR 2SC2757-T33		R46	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
Q60	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R47	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q61	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R48	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
Q62	8-729-216-22	TRANSISTOR 2SA1162-G		R49	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W	
Q65	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R50	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q71	8-729-175-72	TRANSISTOR 2SC2757-T33		R51	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q72	8-729-122-63	TRANSISTOR 2SA1226-E4		R52	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q73	8-729-175-72	TRANSISTOR 2SC2757-T33		R53	1-216-075-00	METAL GLAZE 12K 5% 1/10W	
Q74	8-729-122-63	TRANSISTOR 2SA1226-E4		R54	1-216-025-00	METAL GLAZE 100 5% 1/10W	
Q81	8-729-901-06	TRANSISTOR DTA144EK		R55	1-216-667-11	METAL CHIP 4.7K 0.50% 1/10W	
Q82	8-729-901-01	TRANSISTOR DTC144EK		R56	1-216-025-00	METAL GLAZE 100 5% 1/10W	
				R57	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	

BT

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
R58	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R135	1-216-635-11	METAL CHIP	220 0.50% 1/10W
R59	1-216-025-00	METAL GLAZE	100 5% 1/10W	R136	1-216-635-11	METAL CHIP	220 0.50% 1/10W
R60	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R137	1-216-025-00	METAL GLAZE	100 5% 1/10W
R61	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R138	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R62	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R139	1-216-025-00	METAL GLAZE	100 5% 1/10W
R63	1-216-025-00	METAL GLAZE	100 5% 1/10W	R140	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R64	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R141	1-216-025-00	METAL GLAZE	100 5% 1/10W
R65	1-216-025-00	METAL GLAZE	100 5% 1/10W	R142	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R66	1-216-073-00	METAL GLAZE	10K 5% 1/10W	R143	1-216-025-00	METAL GLAZE	100 5% 1/10W
R67	1-216-659-11	METAL CHIP	2.2K 0.50% 1/10W	R150	1-216-025-00	METAL GLAZE	100 5% 1/10W
R68	1-216-667-11	METAL CHIP	4.7K 0.50% 1/10W	R153	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R69	1-216-659-11	METAL CHIP	2.2K 0.50% 1/10W	R154	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R70	1-216-025-00	METAL GLAZE	100 5% 1/10W	R157	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R71	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R158	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R72	1-216-025-00	METAL GLAZE	100 5% 1/10W	R161	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R73	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R163	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W
R74	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R164	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W
R75	1-216-089-00	METAL GLAZE	47K 5% 1/10W	R165	1-216-025-00	METAL GLAZE	100 5% 1/10W
R76	1-216-073-00	METAL GLAZE	10K 5% 1/10W	R166	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R77	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R167	1-216-643-11	METAL CHIP	470 0.50% 1/10W
R78	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R169	1-216-655-11	METAL CHIP	1.5K 0.50% 1/10W
R79	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R170	1-216-643-11	METAL CHIP	470 0.50% 1/10W
R80	1-216-025-00	METAL GLAZE	100 5% 1/10W	R171	1-216-657-11	METAL CHIP	1.8K 0.50% 1/10W
R81	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R172	1-216-667-11	METAL CHIP	4.7K 0.50% 1/10W
R82	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R173	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W
R83	1-216-025-00	METAL GLAZE	100 5% 1/10W	R174	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R84	1-216-097-00	METAL GLAZE	100K 5% 1/10W	R175	1-216-655-11	METAL CHIP	1.5K 0.50% 1/10W
R85	1-216-097-00	METAL GLAZE	100K 5% 1/10W	R176	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W
R86	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R177	1-216-025-00	METAL GLAZE	100 5% 1/10W
R87	1-216-025-00	METAL GLAZE	100 5% 1/10W	R178	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R88	1-216-025-00	METAL GLAZE	100 5% 1/10W	R179	1-216-025-00	METAL GLAZE	100 5% 1/10W
R89	1-216-025-00	METAL GLAZE	100 5% 1/10W	R181	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W
R103	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R182	1-216-651-11	METAL CHIP	1K 0.50% 1/10W
R104	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R183	1-216-025-00	METAL GLAZE	100 5% 1/10W
R105	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R184	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W
R106	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R185	1-216-643-11	METAL CHIP	470 0.50% 1/10W
R107	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R186	1-216-643-11	METAL CHIP	470 0.50% 1/10W
R108	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R191	1-216-025-00	METAL GLAZE	100 5% 1/10W
R109	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R192	1-216-075-00	METAL GLAZE	12K 5% 1/10W
R110	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R193	1-216-025-00	METAL GLAZE	100 5% 1/10W
R111	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R201	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W
R112	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R202	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W
R113	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W	R203	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W
R114	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W	R204	1-216-033-00	METAL GLAZE	220 5% 1/10W
R115	1-216-025-00	METAL GLAZE	100 5% 1/10W	R205	1-216-033-00	METAL GLAZE	220 5% 1/10W
R116	1-216-075-00	METAL GLAZE	12K 5% 1/10W	R206	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R117	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R207	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R118	1-216-663-11	METAL CHIP	3.3K 0.50% 1/10W	R208	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R119	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R209	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R120	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R210	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R121	1-216-657-11	METAL CHIP	1.8K 0.50% 1/10W	R211	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R122	1-216-667-11	METAL CHIP	4.7K 0.50% 1/10W	R212	1-216-049-00	METAL GLAZE	1K 5% 1/10W
R123	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R213	1-216-089-00	METAL GLAZE	47K 5% 1/10W
R124	1-216-049-00	METAL GLAZE	1K 5% 1/10W	R214	1-216-089-00	METAL GLAZE	47K 5% 1/10W
R125	1-216-659-11	METAL CHIP	2.2K 0.50% 1/10W	R215	1-216-053-00	METAL GLAZE	1.5K 5% 1/10W
R126	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R216	1-216-061-00	METAL GLAZE	3.3K 5% 1/10W
R127	1-216-025-00	METAL GLAZE	100 5% 1/10W	R217	1-216-069-00	METAL GLAZE	6.8K 5% 1/10W
R128	1-216-073-00	METAL GLAZE	10K 5% 1/10W	R218	1-216-061-00	METAL GLAZE	3.3K 5% 1/10W
R129	1-216-643-11	METAL CHIP	470 0.50% 1/10W	R219	1-215-881-11	METAL OXIDE	15 5% 2W
R130	1-216-659-11	METAL CHIP	2.2K 0.50% 1/10W	R331	1-216-121-00	METAL GLAZE	1M 5% 1/10W
R131	1-216-065-00	METAL GLAZE	4.7K 5% 1/10W	R332	1-216-288-11	METAL GLAZE	5.6M 5% 1/8W
R132	1-216-651-11	METAL CHIP	1K 0.50% 1/10W	R341	1-216-121-00	METAL GLAZE	1M 5% 1/10W
R133	1-216-025-00	METAL GLAZE	100 5% 1/10W	R342	1-216-288-11	METAL GLAZE	5.6M 5% 1/8W
R134	1-216-057-00	METAL GLAZE	2.2K 5% 1/10W				

7. ELECTRICAL PARTS LIST



BT C D

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
R361	1-216-121-00	METAL GLAZE 1M 5% 1/10W		Q4	8-729-119-78	TRANSISTOR 2SC2785-HFE	
R362	1-216-288-11	METAL GLAZE 5.6M 5% 1/8W		Q5	8-729-119-78	TRANSISTOR 2SC2785-HFE	
R501	1-216-121-00	METAL GLAZE 1M 5% 1/10W		Q6	8-729-255-12	TRANSISTOR 2SC2551-0	
R502	1-216-049-00	METAL GLAZE 1K 5% 1/10W		Q7	8-729-804-48	TRANSISTOR 2SC3675	
<VARIABLE RESISTOR>				<RESISTOR>			
RV1	1-237-515-21	RES, ADJ, CERMET 1K		R1	1-202-818-00	SOLID 1K 10% 1/2W	
RV2	1-237-517-21	RES, ADJ, CERMET 5K		R2	1-202-818-00	SOLID 1K 10% 1/2W	
RV3	1-237-515-21	RES, ADJ, CERMET 1K		R3	1-202-818-00	SOLID 1K 10% 1/2W	
RV4	1-237-515-21	RES, ADJ, CERMET 1K		R4	1-249-433-11	CARBON 22K 5% 1/4W	
RV5	1-237-515-21	RES, ADJ, CERMET 1K		R5	1-202-818-00	SOLID 1K 10% 1/2W	
RV6	1-237-517-21	RES, ADJ, CERMET 5K		R6	1-202-818-00	SOLID 1K 10% 1/2W	
RV7	1-237-515-21	RES, ADJ, CERMET 1K		R7	1-249-433-11	CARBON 22K 5% 1/4W	
RV8	1-237-515-21	RES, ADJ, CERMET 1K		R8	1-202-818-00	SOLID 1K 10% 1/2W	
RV9	1-237-516-21	RES, ADJ, CERMET 2K		R9	1-202-818-00	SOLID 1K 10% 1/2W	
RV10	1-237-515-21	RES, ADJ, CERMET 1K		R10	1-249-433-11	CARBON 22K 5% 1/4W	
RV11	1-237-516-21	RES, ADJ, CERMET 2K		R11	1-202-719-00	SOLID 1M 10% 1/2W	
RV12	1-237-515-21	RES, ADJ, CERMET 1K		R12	1-202-719-00	SOLID 1M 10% 1/2W	
<CRYSTAL>				R13	1-202-735-00	SOLID 22M 10% 1/2W	
X1	1-567-790-11	VIBRATOR, CRYSTAL		R14	1-249-417-11	CARBON 1K 5% 1/4W	
*****				R15	1-202-721-00	SOLID 1.5M 10% 1/2W	
*A-1330-902-A C BOARD, COMPLETE				R16	1-202-848-00	SOLID 680K 10% 1/2W	
*****				R17	1-249-438-11	CARBON 56K 5% 1/4W	
*1-508-766-00	PIN, CONNECTOR (5MM PITCH) 4P			R18	1-202-719-00	SOLID 1M 10% 1/2W	
*1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P			R19	1-249-429-11	CARBON 10K 5% 1/4W	
$\Delta$ 1-526-819-11	SOCKET, CRT			R20	1-249-430-11	CARBON 12K 5% 1/4W	
*1-566-054-11	PIN, CONNECTOR 2P			R21	1-249-429-11	CARBON 10K 5% 1/4W	
*1-566-055-11	PIN, CONNECTOR 3P			R22	1-249-427-11	CARBON 6.8K 5% 1/4W	
*1-566-056-11	PIN, CONNECTOR 4P			R23	1-202-725-00	SOLID 3.3M 10% 1/2W	
*4-374-912-01	COVER (MAIN), CV VOL			R24	1-202-734-00	SOLID 18M 10% 1/2W	
*4-374-913-01	COVER (REAR LID), CV VOL			R25	1-202-729-00	SOLID 6.8M 10% 1/2W	
<CAPACITOR>				R26	1-247-887-00	CARBON 220K 5% 1/4W	
C1	1-162-114-00	CERAMIC 0.0047MF 2KV		R27	1-249-417-11	CARBON 1K 5% 1/4W	
C2	1-129-724-00	FILM 0.068MF 10% 630V		R28	1-202-818-00	SOLID 1K 10% 1/2W	
C3	1-124-910-11	ELECT 47MF 20% 25V		R29	1-202-818-00	SOLID 1K 10% 1/2W	
C4	1-162-114-00	CERAMIC 0.0047MF 2KV		R30	1-202-818-00	SOLID 1K 10% 1/2W	
C5	1-162-114-00	CERAMIC 0.0047MF 2KV		R31	1-249-417-11	CARBON 1K 5% 1/4W	
C6	1-124-910-11	ELECT 47MF 20% 25V		<VARIABLE RESISTOR>			
C7	1-162-114-00	CERAMIC 0.0047MF 2KV		RV1	1-230-798-11	RES, ADJ, METAL GLAZE 90M	
<DIODE>				<SPARK GAP>			
D1	8-719-911-19	DIODE 1SS119		SG1	1-519-422-11	GAP, SPARK	
D2	8-719-911-19	DIODE 1SS119		SG2	1-519-422-11	GAP, SPARK	
D3	8-719-911-19	DIODE 1SS119		SG3	1-519-422-11	GAP, SPARK	
D4	8-719-911-19	DIODE 1SS119		SG4	1-519-422-11	GAP, SPARK	
<COIL>				SG5	1-519-422-11	GAP, SPARK	
L1	1-408-414-00	INDUCTOR 27UH		SG6	1-519-422-11	GAP, SPARK	
L2	1-408-414-00	INDUCTOR 27UH		*****			
L3	1-408-414-00	INDUCTOR 27UH		*A-1345-980-A D BOARD, COMPLETE			
<TRANSISTOR>				*****			
Q1	8-729-804-48	TRANSISTOR 2SC3675		*1-566-055-11	PIN, CONNECTOR 3P		
Q2	8-729-804-48	TRANSISTOR 2SC3675		*1-566-057-11	PIN, CONNECTOR 5P		
Q3	8-729-255-12	TRANSISTOR 2SC2551-0		*1-566-058-11	PIN, CONNECTOR 6P		
<CAPACITOR>				*1-566-060-11	PIN, CONNECTOR 8P		

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
C1	1-136-153-00	FILM	0.01MF 5% 50V	D2	8-719-911-19	DIODE 1SS119	
C2	1-136-165-00	FILM	0.1MF 5% 50V	D3	8-719-110-03	DIODE RD7.5ESB2	
C3	1-126-163-11	ELECT	4.7MF 20% 16V	D4	8-719-109-84	DIODE RD5.1ESB1	
C4	1-126-160-11	ELECT	1MF 20% 50V	D8	8-719-911-19	DIODE 1SS119	
C5	1-126-160-11	ELECT	1MF 20% 50V				
C6	1-126-160-11	ELECT	1MF 20% 50V				
C7	1-126-160-11	ELECT	1MF 20% 50V				
C8	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C9	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C10	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C11	1-102-973-00	CERAMIC	100PF 5% 50V				
C12	1-136-153-00	FILM	0.01MF 5% 50V				
C13	1-136-153-00	FILM	0.01MF 5% 50V				
C14	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C15	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C16	1-126-160-11	ELECT	1MF 20% 50V				
C17	1-102-112-00	CERAMIC	330PF 10% 50V				
C18	1-136-153-00	FILM	0.01MF 5% 50V				
C19	1-126-160-11	ELECT	1MF 20% 50V				
C20	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C21	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C22	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C23	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C24	1-136-153-00	FILM	0.01MF 5% 50V				
C25	1-136-165-00	FILM	0.1MF 5% 50V				
C26	1-126-157-11	ELECT	10MF 20% 16V				
C27	1-130-479-00	MYLAR	0.0047MF 5% 50V				
C28	1-124-234-00	ELECT	22MF 20% 16V				
C29	1-130-475-00	MYLAR	0.0022MF 5% 50V				
C30	1-130-477-00	FILM	0.0033MF 5% 50V				
C31	1-102-518-11	CERAMIC	33PF 5% 50V				
C32	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C33	1-124-234-00	ELECT	22MF 20% 16V				
C34	1-162-286-31	CERAMIC	220PF 10% 50V				
C36	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C37	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C100	1-124-122-11	ELECT	100MF 20% 25V				
C101	1-124-910-11	ELECT	47MF 20% 16V				
C102	1-126-157-11	ELECT	10MF 20% 16V				
C103	1-126-157-11	ELECT	10MF 20% 16V				
C104	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C105	1-126-157-11	ELECT	10MF 20% 16V				
C106	1-126-157-11	ELECT	10MF 20% 16V				
C200	1-124-122-11	ELECT	100MF 20% 25V				
C201	1-124-910-11	ELECT	47MF 20% 16V				
C202	1-126-157-11	ELECT	10MF 20% 16V				
C203	1-126-157-11	ELECT	10MF 20% 16V				
C204	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C300	1-124-910-11	ELECT	47MF 20% 25V				
C301	1-124-910-11	ELECT	47MF 20% 16V				
C302	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C303	1-126-157-11	ELECT	10MF 20% 16V				
C304	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C305	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C400	1-124-910-11	ELECT	47MF 20% 25V				
C401	1-124-910-11	ELECT	47MF 20% 16V				
C402	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C403	1-126-157-11	ELECT	10MF 20% 16V				
C405	1-161-379-00	CERAMIC	0.01MF 30% 16V				
C406	1-126-157-11	ELECT	10MF 20% 16V				
<DIODE>							
D1	8-719-911-19	DIODE 1SS119					
<IC>							
IC1	8-759-909-70	IC CX23025					
IC2	8-752-033-68	IC CXA1268P					
IC3	8-759-140-53	IC UPD4053BC					
IC4	8-759-145-58	IC UPC4558C					
IC5	8-759-700-08	IC NJM4558S					
IC6	8-759-000-49	IC MC14066BCP					
IC7	8-759-145-58	IC UPC4558C					
IC8	8-759-140-53	IC UPD4053BC					
IC9	8-759-145-58	IC UPC4558C					
IC10	8-759-503-91	IC TL082ACP					
IC11	8-759-145-58	IC UPC4558C					
IC12	8-759-145-58	IC UPC4558C					
IC13	8-759-503-91	IC TL082ACP					
IC14	8-759-729-03	IC NJM2903D					
IC15	8-759-729-03	IC NJM2903D					
IC16	8-759-145-58	IC UPC4558C					
IC17	8-759-729-03	IC NJM2903D					
IC18	8-759-240-69	IC TC4069UBP					
IC19	8-759-100-60	IC UPC1377C					
IC20	8-759-929-62	IC LM7812CT					
IC21	8-759-929-65	IC LM7912CT					
IC22	8-759-701-56	IC NJM78M05FA					
IC23	8-759-701-65	IC NJM79M05FA					
IC24	8-759-140-53	IC UPD4053BC					
IC25	8-759-503-91	IC TL082ACP					
<COIL>							
L1	1-410-068-11	INDUCTOR	5.6MMH				
<TRANSISTOR>							
Q1	8-729-900-89	TRANSISTOR DTC144ES					
Q6	8-729-119-78	TRANSISTOR 2SC2785-HFE					
Q7	8-729-119-78	TRANSISTOR 2SC2785-HFE					
Q8	8-729-900-65	TRANSISTOR DTA144ES					
Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE					
Q10	8-729-900-89	TRANSISTOR DTC144ES					
<RESISTOR>							
R1	1-249-441-11	CARBON	100K 5% 1/4W				
R2	1-249-423-11	CARBON	3.3K 5% 1/4W				
R3	1-249-423-11	CARBON	3.3K 5% 1/4W				
R4	1-249-425-11	CARBON	4.7K 5% 1/4W				
R5	1-249-429-11	CARBON	10K 5% 1/4W				
R6	1-249-429-11	CARBON	10K 5% 1/4W				
R7	1-249-423-11	CARBON	3.3K 5% 1/4W				
R8	1-249-431-11	CARBON	15K 5% 1/4W				
R9	1-249-431-11	CARBON	15K 5% 1/4W				
R10	1-249-431-11	CARBON	15K 5% 1/4W				
R11	1-249-431-11	CARBON	15K 5% 1/4W				
R12	1-249-441-11	CARBON	100K 5% 1/4W				
R16	1-249-429-11	CARBON	10K 5% 1/4W				
R17	1-249-429-11	CARBON	10K 5% 1/4W				
R18	1-249-441-11	CARBON	100K 5% 1/4W				
R19	1-249-429-11	CARBON	10K 5% 1/4W				



## 7. ELECTRICAL PARTS LIST

7-26

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.


D EA


REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
RV26	1-237-503-21	RES, ADJ, CERMET 10K		C51	1-102-121-00	CERAMIC 0.0022MF	10% 50V
RV27	1-237-518-21	RES, ADJ, CERMET 10K		C52	1-102-973-00	CERAMIC 100PF	10% 50V
RV28	1-237-518-21	RES, ADJ, CERMET 10K		C53	1-124-915-11	ELECT 10MF	20% 25V
RV29	1-237-518-21	RES, ADJ, CERMET 10K		C54	1-124-910-11	ELECT 47MF	20% 16V
RV30	1-237-518-21	RES, ADJ, CERMET 10K		C55	1-126-966-11	ELECT 10MF	20% 16V
<SWITCH>				C56	1-123-369-00	ELECT 4.7MF	20% 25V
S1	1-571-908-11	SWITCH, SLIDE		C57	1-124-910-11	ELECT 47MF	20% 16V
*****				C58	1-136-161-00	FILM 0.047MF	5% 50V
*A-1345-802-A	EA BOARD, COMPLETE			C59	1-108-700-11	MYLAR 0.047MF	10% 200V
*****				C60	1-162-117-00	CERAMIC 100PF	10% 500V
*1-508-765-00	PIN, CONNECTOR (5MM PITCH) 3P			C61	1-123-024-21	ELECT 33MF	160V
*1-508-766-00	PIN, CONNECTOR (5MM PITCH) 4P			C62	1-136-169-00	FILM 0.22MF	5% 50V
*1-508-767-00	PIN, CONNECTOR (5MM PITCH) 5P			C63	1-108-700-11	MYLAR 0.047MF	10% 200V
*1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P			C64	1-162-117-00	CERAMIC 100PF	10% 500V
*1-566-055-11	PIN, CONNECTOR 3P			C65	1-136-069-00	FILM 0.0044MF	3% 2KV
*1-566-056-11	PIN, CONNECTOR 4P			C66	1-136-069-00	FILM 0.0044MF	3% 2KV
*1-566-057-11	PIN, CONNECTOR 5P			C67	1-162-134-11	CERAMIC 470PF	10% 2KV
*1-566-058-11	PIN, CONNECTOR 6P			C68	1-136-111-00	FILM 1MF	5% 200V
*1-568-536-11	PLUG (MINIATURE DY) 6P			C69	1-102-973-00	CERAMIC 100PF	10% 50V
*4-381-904-01	SPRING (C)			C70	1-124-666-11	ELECT 4.7MF	20% 200V
*4-381-907-01	INSULATOR (A)			C71	1-124-120-11	ELECT 220MF	20% 16V
*4-381-908-01	INSULATOR (B)			C72	1-102-963-00	CERAMIC 33PF	5% 50V
<CAPACITOR>				C73	1-108-634-11	MYLAR 0.047MF	10% 100V
C1	1-102-963-00	CERAMIC 33PF	5% 50V	C74	1-126-966-11	ELECT 10MF	20% 16V
C2	1-124-917-11	ELECT 33MF	20% 25V	C75	1-161-051-00	CERAMIC 0.01MF	10% 50V
C3	1-124-046-00	ELECT 10MF	160V	C76	1-124-915-11	ELECT 10MF	20% 50V
C4	1-101-361-00	CERAMIC 150PF	5% 50V	C78	1-136-169-00	FILM 0.22MF	5% 50V
C5	1-124-917-11	ELECT 33MF	20% 25V	C79	1-123-369-00	ELECT 4.7MF	20% 25V
C6	1-124-046-00	ELECT 10MF	160V	C80	1-136-165-00	FILM 0.1MF	5% 50V
C7	1-136-136-00	FILM 0.24MF	5% 200V	C82	1-161-051-00	CERAMIC 0.01MF	10% 50V
C8	1-136-106-00	FILM 0.36MF	5% 200V	C83	1-124-915-11	ELECT 10MF	20% 50V
C9	1-136-337-11	FILM 3.3MF	10% 100V	C84	1-126-233-11	ELECT 22MF	20% 16V
C10	1-124-046-00	ELECT 10MF	160V	C85	1-136-165-00	FILM 0.1MF	5% 50V
C11	1-108-700-11	MYLAR 0.047MF	10% 200V	C86	1-136-165-00	FILM 0.1MF	5% 50V
C12	1-108-692-11	MYLAR 0.01MF	10% 200V	C87	1-108-692-11	MYLAR 0.01MF	10% 200V
C13	1-136-165-00	FILM 0.1MF	5% 50V	C88	1-108-692-11	MYLAR 0.01MF	10% 200V
C14	1-102-074-00	CERAMIC 0.001MF	10% 50V	C89	1-162-117-00	CERAMIC 100PF	10% 500V
C15	1-102-121-00	CERAMIC 0.0022MF	10% 50V	C100	1-136-104-11	FILM 0.16MF	5% 200V
C16	1-102-973-00	CERAMIC 100PF	10% 50V	<DIODE>			
C17	1-124-915-11	ELECT 10MF	20% 25V	D1	8-719-110-31	DIODE RD12ESB2	
C18	1-126-966-11	ELECT 10MF	20% 16V	D3	8-719-911-19	DIODE 1SS119	
C19	1-124-910-11	ELECT 47MF	20% 16V	D4	8-719-911-19	DIODE 1SS119	
C20	1-136-169-00	FILM 0.22MF	20% 50V	D5	8-719-300-76	DIODE RH-1A	
C21	1-124-910-11	ELECT 47MF	20% 16V	D6	8-719-110-03	DIODE RD7.5ESB2	
C23	1-136-161-00	FILM 0.047MF	5% 50V	D7	8-719-300-76	DIODE RH-1A	
C24	1-108-700-11	MYLAR 0.047MF	10% 200V	D8	8-719-928-08	DIODE ERD28-08S	
C25	1-162-117-00	CERAMIC 100PF	10% 500V	D9	8-719-300-76	DIODE RH-1A	
C26	1-123-024-21	ELECT 33MF	160V	D10	8-719-300-76	DIODE RH-1A	
C27	1-123-024-21	ELECT 33MF	160V	D12	8-719-901-19	DIODE V11N	
C28	1-136-064-00	FILM 0.002MF	3% 2KV	D13	8-719-300-76	DIODE RH-1A	
C29	1-136-065-00	FILM 0.0027MF	3% 2KV	D14	8-719-300-76	DIODE RH-1A	
C30	1-126-966-11	ELECT 33MF	20% 50V	D15	8-719-300-76	DIODE RH-1A	
C31	1-126-966-11	ELECT 33MF	20% 50V	D16	8-719-300-76	DIODE RH-1A	
C34	1-161-051-00	CERAMIC 0.01MF	10% 50V	D17	8-719-110-31	DIODE RD12ESB2	
C35	1-162-114-00	CERAMIC 0.0047MF	2KV	D19	8-719-911-19	DIODE 1SS119	
C36	1-108-692-11	MYLAR 0.01MF	10% 200V	D20	8-719-911-19	DIODE 1SS119	
C37	1-102-978-00	CERAMIC 220PF	5% 50V	D24	Δ 8-759-157-40	IC UPC574J	
C50	1-136-165-00	FILM 0.1MF	5% 50V	D25	8-719-911-19	DIODE 1SS119	
				D26	8-719-911-19	DIODE 1SS119	
				D27	8-719-000-28	THYRISTOR CRO2AM-8	
				D28	8-719-911-19	DIODE 1SS119	
				D29	Δ 8-759-157-40	IC UPC574J	
				D30	8-719-911-19	DIODE 1SS119	


7. ELECTRICAL PARTS LIST





EA

- The components identified by  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation.  
Should replacement be required, replace only with the value originally used.

Les composants identifiés par une trame et une marque  sont critiques pour la sécurité.  
Ne les remplacer que par une pièce portant le numéro spécifié.

The components identified by shading and mark  are critical for safety.  
Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
D31	8-719-300-76	DIODE RH-1A		R17	1-249-429-11	CARBON	10K 5% 1/4W
D32	8-719-300-76	DIODE RH-1A		R18	1-215-898-11	METAL OXIDE	10K 5% 2W F
D33	8-719-300-76	DIODE RH-1A		R19	1-216-357-00	METAL OXIDE	4.7 5% 1W F
D35	8-719-911-19	DIODE 1SS119		R20	1-249-417-11	CARBON	1K 5% 1/4W
<IC>				R21	1-249-422-11	CARBON	2.7K 5% 1/4W
IC1	8-759-100-75	IC UPC1394C		R22	1-249-422-11	CARBON	2.7K 5% 1/4W
IC2	8-759-100-75	IC UPC1394C		R23	1-249-425-11	CARBON	4.7K 5% 1/4W
IC3	8-759-503-91	IC TL082ACP		R24	1-249-435-11	CARBON	33K 5% 1/4W
IC4	8-759-729-03	IC NJM2903D		R25	1-249-437-11	CARBON	47K 5% 1/4W
IC5	8-759-145-58	IC UPC4558C		R26	1-249-429-11	CARBON	10K 5% 1/4W
<COIL>				R27	1-249-429-11	CARBON	10K 5% 1/4W
L1	1-459-433-00	COIL (WITH CORE)		R28	1-249-435-11	CARBON	33K 5% 1/4W
L2	1-459-433-00	COIL (WITH CORE)		R29	1-249-426-11	CARBON	5.6K 5% 1/4W
L3	1-249-387-11	CARBON 3.3 5%	1/4W F	R30	1-249-429-11	CARBON	10K 5% 1/4W
L4	1-459-111-00	COIL, DRAM CORE (CD1)		R31	1-215-432-00	METAL	3K 1% 1/4W
L5	1-459-111-00	COIL, DRAM CORE (CD1)		R32	1-215-433-00	METAL	3.3K 1% 1/4W
L6	1-459-087-00	COIL, HCC DUST CORE 3.9MMH		R33	1-247-713-11	CARBON	1K 5% 1/4W
L7	1-459-215-00	COIL (WITH CORE)		R34	1-249-417-11	CARBON	1K 5% 1/4W
L8	1-459-207-00	COIL, CORE		R35	1-249-429-11	CARBON	10K 5% 1/4W
<TRANSISTOR>				R36	1-215-902-11	METAL OXIDE	47K 5% 2W F
Q1	8-729-119-76	TRANSISTOR 2SA1175-HFE		R37	1-249-429-11	CARBON	10K 5% 1/4W
Q2	8-729-697-92	TRANSISTOR 2SA979-G		R38	1-249-441-11	CARBON	100K 5% 1/4W
Q3	8-729-140-96	TRANSISTOR 2SD774-34		R39	1-215-900-11	METAL OXIDE	22K 5% 2W F
Q4	8-729-217-33	TRANSISTOR 2SC1173-Y		R40	1-215-857-11	METAL OXIDE	10 5% 1W F
Q5	8-729-141-83	TRANSISTOR 2SB1094-LK		R41	1-216-349-00	METAL OXIDE	1 5% 1W F
Q6	8-729-119-80	TRANSISTOR 2SC2688-LK		R42	1-212-956-00	FUSIBLE	8.2 5% 1/2W F
Q7	8-729-906-53	TRANSISTOR 2SC2542-15		R43	1-249-417-11	CARBON	1K 5% 1/4W
Q8	8-729-255-12	TRANSISTOR 2SC2551-0		R44	1-215-475-00	METAL	180K 1% 1/4W
Q9	8-729-119-76	TRANSISTOR 2SA1175-HFE		R47	1-215-445-00	METAL	10K 1% 1/4W
Q10	8-729-119-80	TRANSISTOR 2SC2688-LK		R48	1-247-725-11	CARBON	10K 5% 1/4W
Q11	8-729-800-80	TRANSISTOR 2SD1399-CA		R49	1-249-448-11	CARBON	1.2 5% 1/4W F
Q12	8-729-313-42	TRANSISTOR 2SD1134-C		R50	1-249-429-11	CARBON	10K 5% 1/4W
Q13	8-729-385-82	TRANSISTOR 2SB858-C		R51	1-249-425-11	CARBON	4.7K 5% 1/4W
Q14	8-729-119-80	TRANSISTOR 2SC2688-LK		R52	1-249-405-11	CARBON	100 5% 1/4W
Q15	8-729-200-17	TRANSISTOR 2SA1091-0		R53	1-215-886-11	METAL OXIDE	100 5% 2W F
Q16	8-729-906-53	TRANSISTOR 2SC2542-15		R54	1-212-998-00	FUSIBLE	470 5% 1/2W F
Q17	8-729-119-80	TRANSISTOR 2SC2688-LK		R60	1-249-417-11	CARBON	1K 5% 1/4W
Q18	8-729-800-80	TRANSISTOR 2SD1399-CA		R61	1-249-433-11	CARBON	22K 5% 1/4W
Q19	8-729-119-76	TRANSISTOR 2SA1175-HFE		R62	1-249-433-11	CARBON	22K 5% 1/4W
Q20	8-729-119-78	TRANSISTOR 2SC2785-HFE		R63	1-249-441-11	CARBON	100K 5% 1/4W
<RESISTOR>				R65	1-249-437-11	CARBON	47K 5% 1/4W
R1	1-247-721-11	CARBON	4.7K 5% 1/4W	R66	1-249-429-11	CARBON	10K 5% 1/4W
R2	1-249-422-11	CARBON	2.7K 5% 1/4W	R67	1-249-429-11	CARBON	10K 5% 1/4W
R3	1-249-469-11	CARBON	100K 5% 1/4W	R68	1-249-434-11	CARBON	27K 5% 1/4W
R4	1-249-435-11	CARBON	33K 5% 1/4W	R69	1-249-427-11	CARBON	6.8K 5% 1/4W
R5	1-249-429-11	CARBON	10K 5% 1/4W	R70	1-249-417-11	CARBON	1K 5% 1/4W
R6	1-249-429-11	CARBON	10K 5% 1/4W	R71	1-215-436-00	METAL	4.3K 1% 1/4W
R7	1-249-429-11	CARBON	10K 5% 1/4W	R72	 1-215-436-00	METAL	1/4W
R8	1-249-421-11	CARBON	2.2K 5% 1/4W	R73	1-215-450-00	METAL	16K 1% 1/4W
R9	1-249-431-11	CARBON	15K 5% 1/4W	R74	1-215-439-00	METAL	5.6K 1% 1/4W
R10	1-249-441-11	CARBON	100K 5% 1/4W	R75	 1-215-439-00	METAL	1/4W
R11	1-249-417-11	CARBON	1K 5% 1/4W	R76	1-249-423-11	CARBON	3.3K 5% 1/4W
R12	1-249-421-11	CARBON	2.2K 5% 1/4W	R77	1-247-887-00	CARBON	220K 5% 1/4W
R13	1-249-448-11	CARBON	1.2 5% 1/4W F	R78	1-249-437-11	CARBON	47K 5% 1/4W
R14	1-249-448-11	CARBON	1.2 5% 1/4W F	R79	1-249-429-11	CARBON	10K 5% 1/4W
R15	1-215-880-00	METAL OXIDE	10 5% 2W F	R80	1-249-429-11	CARBON	10K 5% 1/4W
R16	1-249-429-11	CARBON	10K 5% 1/4W	R81	1-215-898-11	METAL OXIDE	10K 5% 2W F
				R82	1-216-356-00	METAL OXIDE	3.9 5% 1W F
				R83	1-216-348-00	METAL OXIDE	0.82 5% 1W F
				R84	1-249-417-11	CARBON	1K 5% 1/4W
				R85	1-249-417-11	CARBON	1K 5% 1/4W
				R86	1-215-923-00	METAL OXIDE	10K 5% 3W F
				R87	1-216-353-00	METAL OXIDE	2.2 5% 1W F
				R88	1-249-441-11	CARBON	100K 5% 1/4W

The components identified by shading and mark  $\Delta$  are critical for safety.  
Replace only with part number specified.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité.  
Ne les remplacer que par une pièce portant le numéro spécifié.

The components identified by  $\Delta$  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation.  
Should replacement be required, replace only with the value originally used.

EA

EB

GA

REF.NO.	PART NO.	DESCRIPTION	REMARK
R89	1-249-431-11	CARBON 15K 5% 1/4W	
R90	1-249-417-11	CARBON 1K 5% 1/4W	
R91	1-249-425-11	CARBON 4.7K 5% 1/4W	
R92	1-249-441-11	CARBON 100K 5% 1/4W	
R93	1-249-422-11	CARBON 2.7K 5% 1/4W	
R94	1-249-435-11	CARBON 33K 5% 1/4W	
R95	1-249-429-11	CARBON 10K 5% 1/4W	
R96	1-249-421-11	CARBON 2.2K 5% 1/4W	
R97	1-249-393-11	CARBON 10 5% 1/4W	
R98	1-249-429-11	CARBON 10K 5% 1/4W	
R99	1-249-441-11	CARBON 100K 5% 1/4W	
R100	1-249-429-11	CARBON 10K 5% 1/4W	
R101	1-249-429-11	CARBON 10K 5% 1/4W	
R102	1-215-898-11	METAL OXIDE 10K 5% 2W	F
R103	1-215-898-11	METAL OXIDE 10K 5% 2W	F
R104	1-249-423-11	CARBON 3.3K 5% 1/4W	
R105	1-215-459-00	METAL 39K 1% 1/4W	
$\Delta$ R106	1-215-465-00	METAL 68K 1% 1/4W	
R107	1-215-465-00	METAL 68K 1% 1/4W	
$\Delta$ R108	1-215-465-00	METAL 68K 1% 1/4W	
R109	1-215-453-00	METAL 22K 1% 1/4W	
R110	1-215-469-00	METAL 100K 1% 1/4W	
R111	1-249-441-11	CARBON 100K 5% 1/4W	
R112	1-249-423-11	CARBON 3.3K 5% 1/4W	
R113	1-215-455-00	METAL 27K 1% 1/4W	
R114	1-215-437-00	METAL 4.7K 1% 1/4W	
$\Delta$ R115	1-215-486-00	METAL 510K 1% 1/4W	
R116	1-215-486-00	METAL 510K 1% 1/4W	
R117	1-215-453-00	METAL 22K 1% 1/4W	
R118	1-215-469-00	METAL 100K 1% 1/4W	
R119	1-215-437-00	METAL 4.7K 1% 1/4W	
R120	1-215-437-00	METAL 4.7K 1% 1/4W	
R121	1-215-429-00	METAL 2.2K 1% 1/4W	
R122	1-215-437-00	METAL 4.7K 1% 1/4W	
R123	1-215-437-00	METAL 4.7K 1% 1/4W	
R124	1-215-429-00	METAL 2.2K 1% 1/4W	
R125	1-216-357-00	METAL OXIDE 4.7 5% 1W	F
R126	1-216-421-11	METAL OXIDE 12 5% 1W	F
R127	1-202-719-00	SOLID 1M 10% 1/2W	

#### <VARIABLE RESISTOR>

RV1 1-237-513-21 RES, ADJ, CERMET 200

#### <TRANSFORMER>

T1 1-437-078-00 TRANSFORMER, HORIZONTAL DRIVE  
T2 1-437-078-00 TRANSFORMER, HORIZONTAL DRIVE  
T3 1-439-383-11 HOT  
T4 1-437-078-00 TRANSFORMER, HORIZONTAL DRIVE  
T5 1-439-384-11 LOT  
T6 1-437-078-00 TRANSFORMER, HORIZONTAL DRIVE

\*A-1345-800-A EB BOARD, COMPLETE  
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\*1-508-765-00 PIN, CONNECTOR (5MM PITCH) 3P  
\*1-566-054-11 PIN, CONNECTOR 2P  
\*1-566-055-11 PIN, CONNECTOR 3P  
\*1-566-058-11 PIN, CONNECTOR 6P  
\*4-381-904-01 SPRING (C)

\*4-381-907-01 INSULATOR (A)

REF.NO.	PART NO.	DESCRIPTION	REMARK
		<CAPACITOR>	
C1	1-124-122-11	ELECT 100MF 20% 25V	
C2	1-124-666-11	ELECT 4.7MF 20% 200V	
C3	1-124-122-11	ELECT 100MF 20% 25V	
C4	1-102-978-00	CERAMIC 220PF 10% 50V	
C7	1-124-666-11	ELECT 4.7MF 20% 200V	
C8	1-163-157-00	FILM 0.022MF 5% 50V	

#### <DIODE>

D1 8-719-908-03 DIODE GP08D  
D2 8-719-908-03 DIODE GP08D  
D3 8-719-911-19 DIODE 1SS119  
D4 8-719-911-19 DIODE 1SS119  
D5 8-719-911-19 DIODE 1SS119  
D6 8-719-911-19 DIODE 1SS119

#### <TRANSISTOR>

Q1 8-729-697-92 TRANSISTOR 2SA979-G  
Q2 8-729-140-96 TRANSISTOR 2SD774-34  
Q3 8-729-210-91 TRANSISTOR 2SA1091  
Q4 8-729-255-12 TRANSISTOR 2SC2551-0  
Q5 8-729-208-38 TRANSISTOR 2SA1306A-0  
Q6 8-729-208-71 TRANSISTOR 2SC3298B-0  
Q7 8-729-386-12 TRANSISTOR 2SB861-C  
Q8 8-729-255-12 TRANSISTOR 2SC2551-0  
Q9 8-729-119-78 TRANSISTOR 2SC2785-HFE  
Q10 8-729-119-76 TRANSISTOR 2SA1175-HFE

#### <RESISTOR>

R1 1-249-429-11 CARBON 10K 5% 1/4W  
R2 1-249-430-11 CARBON 12K 5% 1/4W  
R3 1-249-426-11 CARBON 5.6K 5% 1/4W  
R4 1-216-465-11 METAL OXIDE 27K 5% 2W F  
R5 1-247-802-11 CARBON 62 5% 1/4W  
R6 1-249-414-11 CARBON 560 5% 1/4W  
R7 1-249-448-11 CARBON 1.2 5% 1/4W F  
R8 1-249-448-11 CARBON 1.2 5% 1/4W F  
R9 1-215-866-11 METAL OXIDE 330 5% 1W F  
R10 1-216-356-00 METAL OXIDE 3.9 5% 1W F  
R11 1-249-429-11 CARBON 10K 5% 1/4W  
R12 1-249-425-11 CARBON 4.7K 5% 1/4W  
R13 1-247-719-11 CARBON 3.3K 5% 1/4W F  
R14 1-247-700-11 CARBON 100 5% 1/4W F  
R15 1-215-873-00 METAL OXIDE 4.7K 5% 1W F  
R16 1-249-429-11 CARBON 10K 5% 1/4W  
R17 1-249-429-11 CARBON 10K 5% 1/4W  
R18 1-249-405-11 CARBON 100 5% 1/4W  
R19 1-247-688-11 CARBON 10 5% 1/4W F  
R20 1-247-688-11 CARBON 10 5% 1/4W F

R21 1-215-948-00 WIREWOUND 10K 10% 5W F

\*A-1316-089-A GA BOARD, COMPLETE (BVM-1316 ONLY)  
\*\*\*\*\*  
\*A-1316-090-A GA BOARD, COMPLETE (BVM-1416P ONLY)  
\*\*\*\*\*  
(INCLUDING GB BOARD)

1-533-167-21 HOLDER, FUSE  
1-533-168-21 HOLDER, FUSE

GA

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
	1-535-316-11	TERMINAL, GROUND (M4)					
$\Delta$	1-570-173-22	SWITCH, VOLTAGE CHANGE		C46	1-126-966-11	ELECT	10MF
$\Delta$	1-580-375-11	INLET 3P		C47	1-136-173-00	FILM	0.47MF
	2-990-241-02	HOLDER (A), PLUG		C48	1-136-173-00	FILM	0.47MF
	*3-337-402-01	BAND, BINDING		C49	1-126-966-11	ELECT	10MF
				C50	1-101-006-00	CERAMIC	0.047MF
	*4-347-706-00	HEAT SINK (TR)					
	*4-371-879-02	COVER, AC SELECT		C51	1-101-006-00	CERAMIC	0.047MF
	4-379-403-01	SPACER (G1), POLISHING		C52	1-101-006-00	CERAMIC	0.047MF
	*4-379-408-01	INSULATOR (G3)		C53	1-101-006-00	CERAMIC	0.047MF
	*4-379-409-01	NUT, PLATE		C54	1-101-006-00	CERAMIC	0.047MF
				C55	1-126-966-11	ELECT	10MF
	4-379-410-01	SPACER (G2), POLISHING					
	*4-379-430-01	PANEL, POWER		C56	1-136-201-11	FILM	0.22MF
	*4-386-847-01	HEAT SINK (S.R.T)		C57	1-124-915-11	ELECT	10MF
	*4-386-848-01	BAND (S.R.T)		C58	1-124-902-00	ELECT	0.47MF
	*4-393-031-01	COVER, FUSE HOLDER		C59	1-130-734-00	FILM	0.0068MF
				C60	1-102-228-00	CERAMIC	470PF
	*4-601-466-11	COVER, 3P INLET					
	<CAPACITOR>			C61	1-102-228-00	CERAMIC	470PF
C1	1-124-024-00	ELECT	4.7MF	C62	1-102-228-00	CERAMIC	470PF
C2	1-124-024-00	ELECT	4.7MF	C63	1-102-228-00	CERAMIC	470PF
C3	1-162-117-00	CERAMIC	100PF	C64	1-124-024-00	ELECT	4.7MF
C4	1-162-117-00	CERAMIC	100PF	C65	1-124-024-00	ELECT	4.7MF
C5	1-162-117-00	CERAMIC	100PF				
				C66	1-162-117-00	CERAMIC	100PF
C6	1-162-117-00	CERAMIC	100PF	C67	1-162-117-00	CERAMIC	100PF
C7	1-126-104-11	ELECT	470MF	C68	1-162-117-00	CERAMIC	100PF
C8	1-126-105-11	ELECT	1000MF	C69	1-124-562-11	ELECT	47MF
C9	1-126-104-11	ELECT	470MF	C70	1-124-171-00	ELECT	100MF
C10	1-126-105-11	ELECT	1000MF				
				C71	1-162-117-00	CERAMIC	100PF
C11	1-126-104-11	ELECT	470MF	C72	1-124-562-11	ELECT	47MF
C12	1-124-602-00	ELECT	2200MF	C73	1-124-171-00	ELECT	100MF
C13	1-126-104-11	ELECT	470MF	C74	1-124-122-11	ELECT	100MF
C14	1-124-602-00	ELECT	2200MF	C75	1-124-122-11	ELECT	100MF
C15	1-124-360-00	ELECT	1000MF				
				C76	$\Delta$ 1-161-953-52	CERAMIC	0.0047MF
C16	1-126-103-11	ELECT	470MF	C77	$\Delta$ 1-161-953-52	CERAMIC	0.0047MF
C17	1-106-375-12	MYLAR	0.022MF	C78	1-162-599-12	CERAMIC	0.0047MF
C18	1-108-638-11	MYLAR	0.1MF	C79	1-162-599-12	CERAMIC	0.0047MF
C19	1-102-030-00	CERAMIC	330PF	C80	1-125-658-11	ELECT	560MF
C20	1-162-117-00	CERAMIC	100PF				
				C81	1-125-658-11	ELECT	560MF
C21	1-102-038-00	CERAMIC	0.001MF	C82	1-123-369-00	ELECT	4.7MF
C22	1-162-117-00	CERAMIC	100PF	C83	1-101-004-00	CERAMIC	0.01MF
C23	1-106-375-12	MYLAR	0.022MF	C84	$\Delta$ 1-136-311-51	FILM	0.47MF
C24	1-108-638-11	MYLAR	0.1MF				
C25	1-124-903-11	ELECT	1MF	$\Delta$	1-136-311-61	FILM	0.47MF
C26	1-101-361-00	CERAMIC	150PF	C85	$\Delta$ 1-162-578-51	CERAMIC	0.0047MF
C27	1-101-361-00	CERAMIC	150PF				
C28	1-126-966-11	ELECT	10MF	C86	$\Delta$ 1-162-578-51	CERAMIC	0.0047MF
C29	1-124-910-11	ELECT	47MF	C87	$\Delta$ 1-162-578-51	CERAMIC	0.0047MF
C30	1-162-117-00	CERAMIC	100PF	C88	$\Delta$ 1-162-578-51	CERAMIC	0.0047MF
				C89	$\Delta$ 1-136-311-51	FILM	0.47MF
C31	1-102-030-00	CERAMIC	330PF				
C32	1-124-903-11	ELECT	1MF	$\Delta$	1-136-311-61	FILM	0.47MF
C33	1-101-361-00	CERAMIC	150PF				
C34	1-101-361-00	CERAMIC	150PF	C90	1-136-171-00	FILM	0.033MF
C35	1-124-903-11	ELECT	1MF				
				C91	1-162-599-12	CERAMIC	0.0047MF
C36	1-124-910-11	ELECT	47MF				
C37	1-130-734-00	FILM	0.0068MF	C92	1-136-171-00	FILM	0.033MF
C38	1-136-165-00	FILM	0.1MF	C93	1-162-599-12	CERAMIC	0.0047MF
C39	1-136-165-00	FILM	0.1MF				
C40	1-123-381-00	ELECT	2.2MF	C94	1-102-038-00	CERAMIC	0.001MF
C41	1-102-038-00	CERAMIC	0.001MF	C95	1-136-173-00	FILM	0.47MF
C42	1-136-165-00	FILM	0.1MF	C96	1-102-050-00	CERAMIC	0.01MF
C43	1-136-165-00	FILM	0.1MF	C97	1-136-173-00	FILM	0.47MF
C44	1-126-966-11	ELECT	10MF	C98	1-136-173-00	FILM	0.47MF
C45	1-162-132-00	CERAMIC	270PF	C99	1-102-050-00	CERAMIC	0.01MF
				C100	1-162-117-00	CERAMIC	100PF
				C101	1-162-117-00	CERAMIC	100PF
				C102	1-136-601-11	FILM	0.01MF
				C103	1-136-601-11	FILM	0.01MF

The components identified by shading and mark  $\Delta$  are critical for safety. Replace only with part number specified.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

GA

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
<DIODE>							
D1	8-719-912-51	DIODE ESAC25-04C		L16	1-421-329-00	COIL, CHOKE	
D2	8-719-918-73	DIODE ESAC25-04N		L17	$\Delta$ 1-421-590-11	TRANSFORMER, LINE FILTER	
D3	8-719-901-73	DIODE ESAD25-04D		L18	$\Delta$ 1-421-590-11	TRANSFORMER, LINE FILTER	
D4	8-719-901-73	DIODE ESAD25-04D		<TRANSISTOR>			
D5	8-719-907-24	DIODE ESAC31-02D		Q1	8-729-301-76	TRANSISTOR STR8124-R	
D6	8-719-907-24	DIODE ESAC31-02D		Q2	8-729-301-76	TRANSISTOR STR8124-R	
D7	8-719-300-33	DIODE RU-3AM		Q3	8-729-140-96	TRANSISTOR 2SD774-34	
D8	8-719-300-52	DIODE CTU-38R		Q4	8-729-140-96	TRANSISTOR 2SD774-34	
D9	8-719-300-53	DIODE CTU-38S		Q5	8-729-140-96	TRANSISTOR 2SD774-34	
D10	8-719-912-51	DIODE ESAC25-04C		Q6	8-729-140-96	TRANSISTOR 2SD774-34	
D11	8-719-918-73	DIODE ESAC25-04N		Q7	8-729-140-97	TRANSISTOR 2SB734-34	
D12	8-719-911-19	DIODE ISS119		Q8	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D13	8-719-911-19	DIODE ISS119		Q9	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D14	8-719-100-58	DIODE RD10EB3		Q10	8-729-313-42	TRANSISTOR 2SD1134-C	
D15	8-719-911-19	DIODE ISS119		Q11	8-729-119-76	TRANSISTOR 2SA1175-HFE	
D16	8-719-911-19	DIODE ISS119		Q12	8-729-140-96	TRANSISTOR 2SD774-34	
D17	8-719-911-19	DIODE ISS119		Q13	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D18	8-719-109-89	DIODE RD5.6ESB2		Q14	8-729-119-78	TRANSISTOR 2SC2785-HFE	
D20	8-719-200-02	DIODE 10E-2		<RESISTOR>			
D21	$\Delta$ 8-719-300-07	DIODE RB406N		R1	1-215-857-11	METAL OXIDE 10 5% 1W F	
D22	8-759-157-40	IC UPC574J		R2	1-215-857-11	METAL OXIDE 10 5% 1W F	
D23	8-719-911-19	DIODE ISS119		R3	1-247-715-11	CARBON 1.5K 5% 1/4W	
D24	8-719-100-58	DIODE RD10EB3		R4	1-215-857-11	METAL OXIDE 10 5% 1W F	
D25	8-719-911-19	DIODE ISS119		R5	1-215-857-11	METAL OXIDE 10 5% 1W F	
D26	8-719-003-08	THYRISTOR CR3CM-8		R6	1-249-447-11	CARBON 1 5% 1/4W F	
D27	8-719-982-04	DIODE ERB81-004		R7	1-247-692-11	CARBON 22 5% 1/4W	
D28	8-719-982-04	DIODE ERB81-004		R8	1-249-418-11	CARBON 1.2K 5% 1/4W	
D29	8-719-982-04	DIODE ERB81-004		R9	1-249-382-11	CARBON 1.2 5% 1/4W F	
D30	8-719-982-04	DIODE ERB81-004		R10	1-249-447-11	CARBON 1 5% 1/4W F	
D31	8-719-300-33	DIODE RU-3AM		R11	1-247-692-11	CARBON 22 5% 1/4W	
D32	8-719-300-33	DIODE RU-3AM		R12	1-249-418-11	CARBON 1.2K 5% 1/4W	
<CONNECTOR>				R13	1-215-866-11	METAL OXIDE 330 5% 1W F	
GA1	1-506-348-XX	PIN, CONNECTOR 3P		R14	1-247-700-11	CARBON 100 5% 1/4W	
GA2	*1-506-371-00	PIN, CONNECTOR 2P		R15	1-247-709-11	CARBON 510 5% 1/4W	
GA3	*1-508-768-00	PIN, CONNECTOR (5MM PITCH) 6P		R16	1-247-709-11	CARBON 510 5% 1/4W	
GA4	*1-508-786-00	PIN, CONNECTOR (5MM PITCH) 2P		R17	1-247-700-11	CARBON 100 5% 1/4W	
GA5	*1-566-055-11	PIN, CONNECTOR 3P		R18	1-249-425-11	CARBON 4.7K 5% 1/4W	
GA6	*1-566-055-11	PIN, CONNECTOR 3P		R19	1-249-419-11	CARBON 1.5K 5% 1/4W	
GA7	*1-566-058-11	PIN, CONNECTOR 6P		R20	1-247-838-00	CARBON 2K 5% 1/4W	
GA8	*1-566-057-11	PIN, CONNECTOR 5P		R21	1-249-417-11	CARBON 1K 5% 1/4W	
<IC>				R22	1-249-409-11	CARBON 220 5% 1/4W	
IC1	1-806-805-11	IC MC5433		R23	1-249-417-11	CARBON 1K 5% 1/4W	
IC2	8-759-904-94	IC TL494CN		R24	1-249-421-11	CARBON 2.2K 5% 1/4W	
IC3	8-759-904-94	IC TL494CN		R25	1-249-409-11	CARBON 220 5% 1/4W	
<COIL>				R26	1-247-700-11	CARBON 100 5% 1/4W	
L3	1-459-643-11	COIL, CHOKE 525UH		R27	1-247-713-11	CARBON 1K 5% 1/4W	
L4	1-459-643-11	COIL, CHOKE 525UH		R28	1-247-713-11	CARBON 1K 5% 1/4W	
L5	1-459-643-11	COIL, CHOKE 525UH		R29	1-247-700-11	CARBON 100 5% 1/4W	
L6	1-459-643-11	COIL, CHOKE 525UH		R30	1-215-886-11	METAL OXIDE 100 5% 2W F	
L7	1-459-207-00	COIL, CORE		R31	1-215-886-11	METAL OXIDE 100 5% 2W F	
L8	1-459-644-11	COIL, CHOKE 2.9MMH		R32	1-215-886-11	METAL OXIDE 100 5% 2W F	
L9	1-459-645-11	COIL, CHOKE 20MMH		R33	1-247-697-11	CARBON 56 5% 1/4W F	
L10	1-421-329-00	COIL, CHOKE		R34	1-247-697-11	CARBON 56 5% 1/4W F	
L11	1-421-329-00	COIL, CHOKE		R35	1-215-863-11	METAL OXIDE 100 5% 1W F	
L12	1-421-329-00	COIL, CHOKE		R36	1-249-425-11	CARBON 4.7K 5% 1/4W	
L13	1-421-329-00	COIL, CHOKE		R37	1-249-420-11	CARBON 1.8K 5% 1/4W	
L14	1-421-329-00	COIL, CHOKE		R38	1-249-429-11	CARBON 10K 5% 1/4W	
L15	1-421-329-00	COIL, CHOKE		R39	1-249-413-11	CARBON 470 5% 1/4W	
				R40	1-215-453-00	METAL 22K 1% 1/4W	

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The components identified by  $\square$  in this manual have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation.  
Should replacement be required, replace only with the value originally used.

Les composants identifiés par une trame et une marque  $\Delta$  sont critiques pour la sécurité.  
Ne les remplacer que par une pièce portant le numéro spécifié.

The components identified by shading and mark  $\Delta$  are critical for safety.  
Replace only with part number specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK	REF. NO.	PART NO.	DESCRIPTION	REMARK
R41	1-249-425-11	CARBON	4.7K 5% 1/4W	TH1 $\Delta$	1-800-820-12	THERMISTOR, POWER	
R42	1-215-437-00	METAL	4.7K 1% 1/4W	THP1 $\Delta$	1-806-387-12	THERMISTOR (POSITIVE)	
R43	1-215-435-00	METAL	3.9K 1% 1/4W	THP2 $\Delta$	1-800-686-33	THERMISTOR (POSITIVE)	
R44	1-215-427-00	METAL	1.8K 1% 1/4W	*****			
R45	1-247-713-11	CARBON	1K 5% 1/4W	*1-627-679-11	GB BOARD		
R46	1-249-417-11	CARBON	1K 5% 1/4W	*****			
R47	1-216-995-11	METAL	820 1% 10W	<CAPACITOR>			
R48	1-215-866-11	METAL OXIDE	330 5% 1W	C1	1-124-903-11	ELECT	1MF 20% 50V
$\square$ R52 $\Delta$		METAL OXIDE	2W	C2	1-124-903-11	ELECT	1MF 20% 50V
$\square$ R53 $\Delta$		METAL	1/4W	<DIODE>			
R54	1-215-901-00	METAL OXIDE	33K 5% 2W	D1	8-719-911-19	DIODE	1SS119
R55	1-215-426-00	METAL	1.6K 1% 1/4W	D2	8-719-110-08	DIODE	RD8.2ESB2
R60	1-249-420-11	CARBON	1.8K 5% 1/4W	D3	8-719-911-19	DIODE	1SS119
R61	1-249-420-11	CARBON	1.8K 5% 1/4W	D4	8-719-911-19	DIODE	1SS119
R62	1-249-429-11	CARBON	10K 5% 1/4W	D5	8-719-911-19	DIODE	1SS119
R64	1-249-426-11	CARBON	5.6K 5% 1/4W	D6	8-719-110-08	DIODE	RD8.2ESB2
R65	1-215-437-00	METAL	4.7K 1% 1/4W	D7	8-719-812-41	DIODE	TLR124
R66	1-215-453-00	METAL	22K 1% 1/4W	D8	8-719-911-19	DIODE	1SS119
$\square$ R67 $\Delta$		METAL	1/2W	D9	8-719-911-19	DIODE	1SS119
$\square$ R68 $\Delta$		METAL	1/4W	D10	8-719-812-41	DIODE	TLR124
R74	1-215-889-00	METAL OXIDE	330 5% 2W	D11	8-719-110-08	DIODE	RD8.2ESB2
R77	1-215-433-00	METAL	3.3K 1% 1/4W	D12	8-719-911-19	DIODE	1SS119
R78	1-215-433-00	METAL	3.3K 1% 1/4W	D13	8-719-911-19	DIODE	1SS119
R80 $\Delta$	1-202-643-35	SOLID	820K 10% 1/2W	D14	8-719-911-19	DIODE	1SS119
R81	1-215-461-00	METAL	47K 1% 1/4W	D15	8-719-911-19	DIODE	1SS119
R82	1-215-461-00	METAL	47K 1% 1/4W	D16	8-719-911-19	DIODE	1SS119
R83	1-215-461-00	METAL	47K 1% 1/4W	D17	8-719-110-08	DIODE	RD8.2ESB2
R84	1-215-459-00	METAL	39K 1% 1/4W	D18	8-719-911-19	DIODE	1SS119
R85	1-215-449-00	METAL	15K 1% 1/4W	D19	8-719-911-19	DIODE	1SS119
R86	1-215-437-00	METAL	4.7K 1% 1/4W	<CONNECTOR>			
R87	1-249-405-11	CARBON	100 5% 1/4W	GA1	*1-506-603-11	PLUG, L TYPE (2.0MM PITCH)	10P
R88	1-249-433-11	CARBON	22K 5% 1/4W	<TRANSISTOR>			
R89	1-249-429-11	CARBON	10K 5% 1/4W	Q1	8-729-119-76	TRANSISTOR	2SA1175-HFE
R90	1-249-429-11	CARBON	10K 5% 1/4W	Q2	8-729-119-78	TRANSISTOR	2SC2785-HFE
R91	1-249-429-11	CARBON	10K 5% 1/4W	Q3	8-729-119-76	TRANSISTOR	2SA1175-HFE
R92 $\Delta$	1-217-295-11	WIREWOUND	5.6 10% 5W	Q4	8-729-119-78	TRANSISTOR	2SC2785-HFE
R93	1-215-886-11	METAL OXIDE	100 5% 2W	Q5	8-729-119-76	TRANSISTOR	2SA1175-HFE
R94	1-205-538-00	WIREWOUND	4.7 10% 10W	Q6	8-729-119-76	TRANSISTOR	2SA1175-HFE
R95	1-215-904-11	METAL OXIDE	100K 5% 2W	Q7	8-729-119-76	TRANSISTOR	2SA1175-HFE
R96	1-215-904-11	METAL OXIDE	100K 5% 2W	Q8	8-729-119-78	TRANSISTOR	2SC2785-HFE
R97	1-215-904-11	METAL OXIDE	100K 5% 2W	Q9	8-729-119-76	TRANSISTOR	2SA1175-HFE
R98	1-215-904-11	METAL OXIDE	100K 5% 2W	Q10	8-729-119-78	TRANSISTOR	2SC2785-HFE
<VARIABLE RESISTOR>				<RESISTOR>			
RV1	1-237-514-21	RES, ADJ, CERMET	500	R1	1-249-427-11	CARBON	6.8K 5% 1/4W
RV2	1-237-515-21	RES, ADJ, CERMET	1K	R2	1-249-428-11	CARBON	8.2K 5% 1/4W
<RELAY>				R3	1-249-429-11	CARBON	10K 5% 1/4W
RY1 $\Delta$	1-515-805-11	RELAY, POWER		R4	1-249-427-11	CARBON	6.8K 5% 1/4W
<TRANSFORMER>				R5	1-249-420-11	CARBON	1.8K 5% 1/4W
T1 $\Delta$	1-448-433-11	TRANSFORMER, CONVERTER (S.R.T)		R6	1-249-427-11	CARBON	6.8K 5% 1/4W
T2 $\Delta$	1-447-106-11	TRANSFORMER, DRIVE		R7	1-249-420-11	CARBON	1.8K 5% 1/4W
T3 $\Delta$	1-421-624-12	TRANSFORMER, CURRENT		R8	1-249-429-11	CARBON	10K 5% 1/4W
T4 $\Delta$	1-447-426-12	TRANSFORMER, CONVERTER		R9	1-249-427-11	CARBON	6.8K 5% 1/4W
T5 $\Delta$	1-448-432-12	TRANSFORMER, CONVERTER (S.R.T)		R10	1-249-428-11	CARBON	8.2K 5% 1/4W
T6 $\Delta$	1-447-106-11	TRANSFORMER, DRIVE					
T7 $\Delta$	1-421-624-12	TRANSFORMER, CURRENT					
<THERMISTOR>							



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REF.NO.	PART NO.	DESCRIPTION	REMARK
R11	1-249-424-11	CARBON 3.9K 5% 1/4W	
R12	1-249-421-11	CARBON 2.2K 5% 1/4W	
R13	1-249-425-11	CARBON 4.7K 5% 1/4W	
R14	1-249-421-11	CARBON 2.2K 5% 1/4W	
R15	1-249-424-11	CARBON 3.9K 5% 1/4W	
R16	1-249-421-11	CARBON 2.2K 5% 1/4W	
R17	1-249-425-11	CARBON 4.7K 5% 1/4W	
R18	1-249-421-11	CARBON 2.2K 5% 1/4W	
R19	1-249-429-11	CARBON 10K 5% 1/4W	
R20	1-249-429-11	CARBON 10K 5% 1/4W	
R21	1-249-429-11	CARBON 10K 5% 1/4W	
R22	1-249-423-11	CARBON 3.3K 5% 1/4W	
R23	1-249-423-11	CARBON 3.3K 5% 1/4W	
R24	1-249-429-11	CARBON 10K 5% 1/4W	
R25	1-249-429-11	CARBON 10K 5% 1/4W	
*****			
	*1-617-885-11	GC BOARD	*****
<CAPACITOR>			
C1	1-126-233-11	ELECT 22MF 20% 25V	
C2	1-126-233-11	ELECT 22MF 20% 25V	
C3	1-126-233-11	ELECT 22MF 20% 25V	
C4	1-126-233-11	ELECT 22MF 20% 25V	
C5	1-126-233-11	ELECT 22MF 20% 25V	
C6	1-126-233-11	ELECT 22MF 20% 25V	
C7	1-126-233-11	ELECT 22MF 20% 25V	
C8	1-126-233-11	ELECT 22MF 20% 25V	
C9	1-126-233-11	ELECT 22MF 20% 25V	
C12	1-101-004-00	CERAMIC 0.01MF 50V	
C14	1-101-004-00	CERAMIC 0.01MF 50V	
C16	1-101-004-00	CERAMIC 0.01MF 50V	
C17	1-101-004-00	CERAMIC 0.01MF 50V	
C18	1-101-004-00	CERAMIC 0.01MF 50V	
<CONNECTOR>			
GC1	*1-566-044-11	PIN, CONNECTOR 5P	
GC2	*1-566-057-11	PIN, CONNECTOR 5P	
GC3	*1-566-044-11	PIN, CONNECTOR 5P	
<IC>			
IC1	8-759-929-65	IC LM7912CT	
IC2	8-759-929-65	IC LM7912CT	
IC3	8-759-701-79	IC NJM7812FA	
IC4	8-759-701-79	IC NJM7812FA	
*****			
	*1-642-045-11	HA BOARD	*****
	*1-566-041-11	PIN, CONNECTOR 2P	
	*1-566-042-11	PIN, CONNECTOR 3P	
	*1-566-044-11	PIN, CONNECTOR 5P	
	*1-566-051-11	PIN, CONNECTOR 12P	
<RESISTOR>			
R201	1-249-406-11	CARBON 120 5% 1/4W	

REF.NO.	PART NO.	DESCRIPTION	REMARK
<SWITCH>			
S201	1-570-565-11	SWITCH, PUSH (10 KEY)	
*****			
	*1-647-257-11	HW BOARD	*****
	*4-391-246-01	SHEET, INSULATING	
<DIODE>			
D1	8-719-938-68	DIODE GL3HY8	
	*4-026-910-00	HOLDER, LED; D1	
D2	8-719-812-41	DIODE TLR124	
	*4-026-910-00	HOLDER, LED; D2	
<SWITCH>			
S101	1-570-566-11	SWITCH, PUSH (4 KEY)	
*****			
	*1-627-682-11	HH BOARD	*****
	*1-566-614-11	PLUG (L TYPE) 3P	
<VARIABLE RESISTOR>			
RV1	1-238-332-11	RES, VAR, CARBON 20K	
RV2	1-238-332-11	RES, VAR, CARBON 20K	
RV3	1-238-332-11	RES, VAR, CARBON 20K	
RV4	1-238-332-11	RES, VAR, CARBON 20K	
*****			
	*1-647-258-11	HX BOARD	*****
<SWITCH>			
S1	1-692-470-11	SWITCH, PUSH (4 KEY)	
*****			
	A-1375-114-A	HY BOARD, COMPLETE	*****
<CAPACITOR>			
C1	1-124-584-00	ELECT 100MF 20% 10V	
C2	1-124-584-00	ELECT 100MF 20% 10V	
C3	1-124-584-00	ELECT 100MF 20% 10V	
C4	1-163-031-11	CERAMIC CHIP 0.01MF 50V	
C5	1-163-031-11	CERAMIC CHIP 0.01MF 50V	
C6	1-163-031-11	CERAMIC CHIP 0.01MF 50V	
<DIODE>			
D1	8-719-404-46	DIODE MA110	
D2	8-719-404-46	DIODE MA110	
D3	8-719-404-46	DIODE MA110	
D4	8-719-404-46	DIODE MA110	

HY

REF.NO. PART NO. DESCRIPTION

D5	8-719-404-46	DIODE MA110
D6	8-719-404-46	DIODE MA110
D7	8-719-404-46	DIODE MA110
D8	8-719-404-46	DIODE MA110
D9	8-719-404-46	DIODE MA110
D10	8-719-404-46	DIODE MA110
D11	8-719-404-46	DIODE MA110
D12	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D12
D13	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D13
D14	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D14
D15	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D15
D16	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D16
D17	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D17
D18	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D18
D19	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D19
D20	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D20
D21	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D21
D23	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D23
D24	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D24
D25	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D25
D26	8-719-404-46	DIODE MA110
D27	8-719-404-46	DIODE MA110
D28	8-719-404-46	DIODE MA110
D29	8-719-404-46	DIODE MA110
D30	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D30
D31	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D31
D32	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D32
D33	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D33
D34	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D34
D35	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D35
D36	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D36
D37	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D37
D38	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D38
D39	8-719-404-46	DIODE MA110
D40	8-719-404-46	DIODE MA110
D41	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D41
D42	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D42
D43	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D43
D44	8-719-938-68	DIODE GL3HY8

REMARK

REF.NO. PART NO. DESCRIPTION

REMARK

D45	*4-374-937-01	HOLDER, LED; D44
	8-719-404-46	DIODE MA110
D46	8-719-404-46	DIODE MA110
D47	8-719-404-46	DIODE MA110
D48	8-719-404-46	DIODE MA110
D49	8-719-404-46	DIODE MA110
D50	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D50
D51	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D51
D52	8-719-404-46	DIODE MA110
D53	8-719-404-46	DIODE MA110
D54	8-719-404-46	DIODE MA110
D55	8-719-404-46	DIODE MA110
D56	8-719-404-46	DIODE MA110
D57	8-719-404-46	DIODE MA110
D58	8-719-404-46	DIODE MA110
D59	8-719-404-46	DIODE MA110
D60	8-719-404-46	DIODE MA110
D61	8-719-404-46	DIODE MA110
D62	8-719-404-46	DIODE MA110
D63	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D63
D64	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D64
D65	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D65
D66	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D66
D67	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D67
D68	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D68
D69	8-719-938-68	DIODE GL3HY8
	*4-374-937-01	HOLDER, LED; D69

&lt;CONNECTOR&gt;

HY1	*1-566-045-11	PIN, CONNECTOR 6P
HY2	*1-566-047-11	PIN, CONNECTOR 8P
HY3	*1-566-052-11	PIN, CONNECTOR 13P
HY4	*1-566-047-11	PIN, CONNECTOR 8P

&lt;IC&gt;

IC1	8-757-991-00	IC CX-7991
IC2	8-757-991-00	IC CX-7991
IC3	8-757-991-00	IC CX-7991

&lt;RESISTOR&gt;

JR1	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR2	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR3	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR4	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR5	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR6	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR7	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR8	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR9	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR10	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR11	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR12	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR13	1-216-295-00	METAL GLAZE	0	5%	1/10W
JR14	1-216-295-00	METAL GLAZE	0	5%	1/10W



REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
JR15	1-216-295-00	METAL GLAZE	0 5% 1/10W	S8	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
JR16	1-216-295-00	METAL GLAZE	0 5% 1/10W	S9	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
JR17	1-216-295-00	METAL GLAZE	0 5% 1/10W	S10	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
JR18	1-216-295-00	METAL GLAZE	0 5% 1/10W	S11	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
<TRANSISTOR>				S12	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
Q1	8-729-175-72	TRANSISTOR 2SC2757-T33		S13	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
<RESISTOR>				S14	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R1	1-216-043-00	METAL GLAZE	560 5% 1/10W	S15	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R2	1-216-043-00	METAL GLAZE	560 5% 1/10W	S16	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R3	1-216-043-00	METAL GLAZE	560 5% 1/10W	S17	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R4	1-216-043-00	METAL GLAZE	560 5% 1/10W	S19	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R5	1-216-043-00	METAL GLAZE	560 5% 1/10W	S20	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R6	1-216-043-00	METAL GLAZE	560 5% 1/10W	S21	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R7	1-216-043-00	METAL GLAZE	560 5% 1/10W	S22	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R8	1-216-043-00	METAL GLAZE	560 5% 1/10W	S23	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R9	1-216-043-00	METAL GLAZE	560 5% 1/10W	S24	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R10	1-216-043-00	METAL GLAZE	560 5% 1/10W	S25	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R11	1-216-043-00	METAL GLAZE	560 5% 1/10W	S26	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R12	1-216-043-00	METAL GLAZE	560 5% 1/10W	S27	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R13	1-216-043-00	METAL GLAZE	560 5% 1/10W	S28	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R14	1-216-043-00	METAL GLAZE	560 5% 1/10W	S29	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R15	1-216-043-00	METAL GLAZE	560 5% 1/10W	S30	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R16	1-216-043-00	METAL GLAZE	560 5% 1/10W	S31	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R17	1-216-043-00	METAL GLAZE	560 5% 1/10W	S32	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
R18	1-216-043-00	METAL GLAZE	560 5% 1/10W	*****			
R19	1-216-045-00	METAL GLAZE	680 5% 1/10W	A-1371-896-A HZ BOARD, COMPLETE			
R20	1-216-033-00	METAL GLAZE	220 5% 1/10W	*****			
R21	1-216-043-00	METAL GLAZE	560 5% 1/10W	<CAPACITOR>			
R22	1-216-033-00	METAL GLAZE	220 5% 1/10W	C1	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R23	1-216-049-00	METAL GLAZE	1K 5% 1/10W	C2	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R24	1-216-043-00	METAL GLAZE	560 5% 1/10W	C3	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R25	1-216-043-00	METAL GLAZE	560 5% 1/10W	C4	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R26	1-216-043-00	METAL GLAZE	560 5% 1/10W	C5	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R27	1-216-049-00	METAL GLAZE	1K 5% 1/10W	C6	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R28	1-216-049-00	METAL GLAZE	1K 5% 1/10W	C7	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R29	1-216-049-00	METAL GLAZE	1K 5% 1/10W	C8	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R30	1-216-043-00	METAL GLAZE	560 5% 1/10W	C9	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R31	1-216-043-00	METAL GLAZE	560 5% 1/10W	C10	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R32	1-216-043-00	METAL GLAZE	560 5% 1/10W	C11	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R33	1-216-043-00	METAL GLAZE	560 5% 1/10W	C12	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R34	1-216-043-00	METAL GLAZE	560 5% 1/10W	C13	1-163-227-11	CERAMIC CHIP 10PF	0.5PF 50V
R35	1-216-043-00	METAL GLAZE	560 5% 1/10W	C14	1-163-239-11	CERAMIC CHIP 33PF	5% 50V
R36	1-216-043-00	METAL GLAZE	560 5% 1/10W	C15	1-163-097-00	CERAMIC CHIP 15PF	5% 50V
R37	1-216-043-00	METAL GLAZE	560 5% 1/10W	C16	1-163-031-11	CERAMIC CHIP 0.01MF	50V
R38	1-216-043-00	METAL GLAZE	560 5% 1/10W	C17	1-163-097-00	CERAMIC CHIP 15PF	5% 50V
R39	1-216-043-00	METAL GLAZE	560 5% 1/10W	C18	1-163-097-00	CERAMIC CHIP 15PF	5% 50V
R40	1-216-043-00	METAL GLAZE	560 5% 1/10W	C19	1-124-779-00	ELECT CHIP 10MF	20% 16V
R41	1-216-043-00	METAL GLAZE	560 5% 1/10W	C21	1-126-769-21	ELECT CHIP 100MF	20% 14V
R42	1-216-043-00	METAL GLAZE	560 5% 1/10W	C22	1-126-769-21	ELECT CHIP 100MF	20% 14V
R43	1-216-043-00	METAL GLAZE	560 5% 1/10W	C23	1-126-204-11	ELECT CHIP 47MF	20% 16V
<SWITCH>				C24	1-126-204-11	ELECT CHIP 47MF	20% 16V
S1	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C25	1-126-769-21	ELECT CHIP 100MF	20% 14V
S2	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C26	1-126-769-21	ELECT CHIP 100MF	20% 14V
S3	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C41	1-126-769-21	ELECT CHIP 100MF	20% 14V
S4	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C42	1-126-769-21	ELECT CHIP 100MF	20% 14V
S5	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C43	1-126-204-11	ELECT CHIP 47MF	20% 16V
S6	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C44	1-126-204-11	ELECT CHIP 47MF	20% 16V
S7	1-572-482-11	SWITCH, KEY BOARD (1 KEY)		C45	1-126-204-11	ELECT CHIP 47MF	20% 16V
				C46	1-126-769-21	ELECT CHIP 100MF	20% 14V
				C47	1-126-769-21	ELECT CHIP 100MF	20% 14V



## 7. ELECTRICAL PARTS LIST

7-36

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
IC24	8-759-164-55	IC HD6475368CP-BVM		R6	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
<IC SOCKET>				R7	1-249-417-11	CARBON 1K 5% 1/4W	
ICS3	1-526-652-21	SOCKET, IC (DP) 8P		R8	1-216-091-00	METAL GLAZE 56K 5% 1/10W	
ICS24	1-540-069-11	SOCKET, IC (IC113) 84P		R9	1-249-417-11	CARBON 1K 5% 1/4W	
<RESISTOR>				R10	1-216-090-00	METAL GLAZE 51K 5% 1/10W	
JR1	1-216-295-00	METAL GLAZE 0 5% 1/10W		R11	1-216-080-00	METAL GLAZE 20K 5% 1/10W	
JR2	1-216-295-00	METAL GLAZE 0 5% 1/10W		R12	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
JR3	1-216-295-00	METAL GLAZE 0 5% 1/10W		R13	1-216-091-00	METAL GLAZE 56K 5% 1/10W	
JR4	1-216-295-00	METAL GLAZE 0 5% 1/10W		R14	1-249-417-11	CARBON 1K 5% 1/4W	
<COIL>				R15	1-216-091-00	METAL GLAZE 56K 5% 1/10W	
L1	1-408-409-00	INDUCTOR 10UH		R16	1-249-417-11	CARBON 1K 5% 1/4W	
L2	1-408-409-00	INDUCTOR 10UH		R17	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
L3	1-410-210-21	INDUCTOR CHIP 33UH		R18	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
L4	1-408-409-00	INDUCTOR 10UH		R19	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
<TRANSISTOR>				R20	1-216-091-00	METAL GLAZE 56K 5% 1/10W	
Q2	8-729-901-01	TRANSISTOR DTC144EK		R21	1-249-417-11	CARBON 1K 5% 1/4W	
Q3	8-729-901-01	TRANSISTOR DTC144EK		R22	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q4	8-729-901-01	TRANSISTOR DTC144EK		R23	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
Q5	8-729-901-01	TRANSISTOR DTC144EK		R24	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q6	8-729-901-01	TRANSISTOR DTC144EK		R25	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q7	8-729-901-01	TRANSISTOR DTC144EK		R26	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q8	8-729-901-01	TRANSISTOR DTC144EK		R27	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
Q9	8-729-901-01	TRANSISTOR DTC144EK		R28	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q10	8-729-901-01	TRANSISTOR DTC144EK		R29	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q11	8-729-901-01	TRANSISTOR DTC144EK		R30	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
Q12	8-729-901-01	TRANSISTOR DTC144EK		R31	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q13	8-729-901-01	TRANSISTOR DTC144EK		R32	1-216-079-00	METAL GLAZE 18K 5% 1/10W	
Q14	8-729-901-01	TRANSISTOR DTC144EK		R33	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q15	8-729-901-01	TRANSISTOR DTC144EK		R34	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q16	8-729-901-01	TRANSISTOR DTC144EK		R35	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q17	8-729-901-01	TRANSISTOR DTC144EK		R36	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q18	8-729-901-01	TRANSISTOR DTC144EK		R37	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q19	8-729-122-63	TRANSISTOR 2SA1226-E4		R38	1-249-417-11	CARBON 1K 5% 1/4W	
Q20	8-729-901-01	TRANSISTOR DTC144EK		R39	1-216-093-00	METAL GLAZE 68K 5% 1/10W	
Q21	8-729-901-01	TRANSISTOR DTC144EK		R40	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q22	8-729-901-01	TRANSISTOR DTC144EK		R41	1-249-417-11	CARBON 1K 5% 1/4W	
Q23	8-729-901-01	TRANSISTOR DTC144EK		R42	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
Q24	8-729-901-01	TRANSISTOR DTC144EK		R43	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q25	8-729-901-01	TRANSISTOR DTC144EK		R44	1-249-417-11	CARBON 1K 5% 1/4W	
Q26	8-729-901-01	TRANSISTOR DTC144EK		R45	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q27	8-729-901-01	TRANSISTOR DTC144EK		R46	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
Q28	8-729-901-06	TRANSISTOR DTA144EK		R47	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
Q29	8-729-901-01	TRANSISTOR DTC144EK		R48	1-249-417-11	CARBON 1K 5% 1/4W	
Q30	8-729-122-63	TRANSISTOR 2SA1226-E4		R49	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q900	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R50	1-249-417-11	CARBON 1K 5% 1/4W	
Q901	8-729-120-28	TRANSISTOR 2SC1623-L5L6		R51	1-249-417-11	CARBON 1K 5% 1/4W	
Q902	8-729-901-01	TRANSISTOR DTC144EK		R52	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
Q903	8-729-901-01	TRANSISTOR DTC144EK		R53	1-249-417-11	CARBON 1K 5% 1/4W	
<RESISTOR>				R54	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R1	1-216-091-00	METAL GLAZE 56K 5% 1/10W		R55	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R2	1-216-091-00	METAL GLAZE 56K 5% 1/10W		R56	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R3	1-249-417-11	CARBON 1K 5% 1/4W		R57	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R4	1-216-025-00	METAL GLAZE 100 5% 1/10W		R58	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R5	1-216-073-00	METAL GLAZE 10K 5% 1/10W		R59	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
				R60	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R61	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R62	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R63	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
				R64	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R65	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
				R66	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R67	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
				R68	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
				R69	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	

HZ

P

QA

QB

TB

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for safety.  
Replace only with part number  
specified.

REF. NO.	PART NO.	DESCRIPTION	REMARK
R70	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R71	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R73	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R74	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R75	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R76	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R77	1-216-074-00	METAL GLAZE 11K 5% 1/10W	
R78	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R79	1-216-080-00	METAL GLAZE 20K 5% 1/10W	
R80	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R81	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R82	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R83	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R84	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R85	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R86	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R87	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R88	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R89	1-216-097-00	METAL GLAZE 100K 5% 1/10W	
R90	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R91	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R92	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R93	1-216-089-00	METAL GLAZE 47K 5% 1/10W	
R94	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R95	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R97	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R100	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R101	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R102	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R103	1-216-065-00	METAL GLAZE 4.7K 5% 1/10W	
R104	1-216-053-00	METAL GLAZE 1.5K 5% 1/10W	
R105	1-216-053-00	METAL GLAZE 1.5K 5% 1/10W	
R106	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R107	1-216-073-00	METAL GLAZE 10K 5% 1/10W	
R111	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R112	1-216-081-00	METAL GLAZE 22K 5% 1/10W	
R181	1-216-620-11	METAL CHIP 51 0.50% 1/10W	
R191	1-216-049-00	METAL GLAZE 1K 5% 1/10W	
R208	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
R209	1-216-059-00	METAL GLAZE 2.7K 5% 1/10W	
<SWITCH>			
S1	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
S2	1-572-482-11	SWITCH, KEY BOARD (1 KEY)	
<CRYSTAL>			
X1	1-577-121-11	VIBRATOR, CRYSTAL	
*****			
*1-627-670-11 P BOARD			
*****			
$\Delta$ 1-439-395-11 TRANSFORMER ASSY, FLYBACK (NX-2110)			
*4-341-752-01 EYELET			
*****			
*1-617-895-11 QA BOARD			
*****			
<CAPACITOR>			
C1	1-108-692-11	MYLAR 0.01MF 10% 200V	

REF. NO.	PART NO.	DESCRIPTION	REMARK
C2	1-126-235-11	ELECT 100MF 20% 16V	
C3	1-101-004-00	CERAMIC 0.01MF 50V	
C4	1-108-692-11	MYLAR 0.01MF 10% 200V	
C5	1-126-235-11	ELECT 100MF 20% 16V	
C6	1-101-004-00	CERAMIC 0.01MF 50V	
C7	1-108-692-11	MYLAR 0.01MF 10% 200V	
C8	1-126-235-11	ELECT 100MF 20% 16V	
C9	1-101-004-00	CERAMIC 0.01MF 50V	
C10	1-102-951-00	CERAMIC 15PF 5% 50V	
C11	1-102-951-00	CERAMIC 15PF 5% 50V	
C12	1-102-951-00	CERAMIC 15PF 5% 50V	
<RESISTOR>			
R1	1-215-449-00	METAL 15K 1% 1/4W	
R2	1-215-449-00	METAL 15K 1% 1/4W	
R3	1-249-439-11	CARBON 68K 5% 1/4W	
<SWITCH>			
S1	1-570-857-11	SWITCH, SLIDE	
S2	1-570-857-11	SWITCH, SLIDE	
S3	1-570-857-11	SWITCH, SLIDE	
*****			
*1-618-786-11 QB BOARD			
*****			
<CAPACITOR>			
C1	1-108-692-11	MYLAR 0.01MF 10% 200V	
C2	1-126-235-11	ELECT 100MF 20% 16V	
C3	1-101-004-00	CERAMIC 0.01MF 50V	
C4	1-108-692-11	MYLAR 0.01MF 10% 200V	
C5	1-126-235-11	ELECT 100MF 20% 16V	
C6	1-101-004-00	CERAMIC 0.01MF 50V	
C7	1-108-692-11	MYLAR 0.01MF 10% 200V	
C8	1-126-235-11	ELECT 100MF 20% 16V	
C9	1-101-004-00	CERAMIC 0.01MF 50V	
C10	1-102-951-00	CERAMIC 15PF 5% 50V	
C11	1-102-951-00	CERAMIC 15PF 5% 50V	
C12	1-102-951-00	CERAMIC 15PF 5% 50V	
<RESISTOR>			
R1	1-215-449-00	METAL 15K 1% 1/4W	
R2	1-215-449-00	METAL 15K 1% 1/4W	
R3	1-215-449-00	METAL 15K 1% 1/4W	
<SWITCH>			
S1	1-570-857-11	SWITCH, SLIDE	
S2	1-570-857-11	SWITCH, SLIDE	
S3	1-570-857-11	SWITCH, SLIDE	
*****			
*A-1390-344-A TB BOARD, COMPLETE			
*****			
<CONNECTOR>			
CN1	*1-564-431-11	POST, CONNECTOR 3P	
CN2	*1-564-431-11	POST, CONNECTOR 3P	
CN11	*1-561-724-00	SOCKET, CONNECTOR 2P	

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TB V W X Y Z

REF.NO.	PART NO.	DESCRIPTION	REMARK	REF.NO.	PART NO.	DESCRIPTION	REMARK
CN12	*1-561-724-00	SOCKET, CONNECTOR 2P		*1-627-678-11	W BOARD	*****	
<RESISTOR>				<CAPACITOR>			
R100	1-249-422-11	CARBON	2.7K 5% 1/4W	C1	1-108-692-11	MYLAR	0.01MF 10% 200V
R101	1-249-413-11	CARBON	470 5% 1/4W	C2	1-108-692-11	MYLAR	0.01MF 10% 200V
<CONNECTOR>				<RESISTOR>			
TB4	*1-566-054-11	PIN, CONNECTOR 2P		R1	1-214-702-00	METAL	75 1% 1/4W
TB5	*1-566-054-11	PIN, CONNECTOR 2P		R2	1-214-702-00	METAL	75 1% 1/4W
TB6	*1-566-060-11	PIN, CONNECTOR 8P		R3	1-214-702-00	METAL	75 1% 1/4W
TB7	*1-566-054-11	PIN, CONNECTOR 2P		*****			
TB8	*1-566-058-11	PIN, CONNECTOR 6P		*1-627-676-11	X BOARD	*****	
TB9	*1-566-060-11	PIN, CONNECTOR 8P		<DIODE>			
TB10	*1-566-064-11	PIN, CONNECTOR 12P		D1	8-719-920-21	DIODE LT-9220H	
TB11	*1-566-055-11	PIN, CONNECTOR 3P		*****			
TB12	*1-566-064-11	PIN, CONNECTOR 12P		*1-627-671-11	Y BOARD	*****	
TB13	*1-566-062-11	PIN, CONNECTOR 10P		<DIODE>			
TB14	*1-566-064-11	PIN, CONNECTOR 12P		D1	8-719-812-43	DIODE TLG124A	
TB15	*1-566-060-11	PIN, CONNECTOR 8P		*****			
TB16	*1-566-057-11	PIN, CONNECTOR 5P		*1-627-687-11	Z BOARD	*****	
TB17	*1-566-057-11	PIN, CONNECTOR 5P		<DIODE>			
TB18	*1-566-055-11	PIN, CONNECTOR 3P		D1	8-719-812-43	DIODE TLG124A	
TB19	*1-566-056-11	PIN, CONNECTOR 4P		*****			
TB20	*1-566-056-11	PIN, CONNECTOR 4P		*1-627-687-11	Z BOARD	*****	
TB21	*1-566-056-11	PIN, CONNECTOR 4P		<DIODE>			
TB22	*1-566-054-11	PIN, CONNECTOR 2P		D1	8-719-812-43	DIODE TLG124A	
TB23	*1-566-054-11	PIN, CONNECTOR 2P		*****			
TB24	*1-566-054-11	PIN, CONNECTOR 2P		*1-627-687-11	Z BOARD	*****	
TB28	*1-566-062-11	PIN, CONNECTOR 10P		<DIODE>			
TB29	*1-566-060-11	PIN, CONNECTOR 8P		D1	8-719-812-43	DIODE TLG124A	
TB31	*1-561-337-00	CONNECTOR, MULTI		*****			
TB32	*1-561-337-00	CONNECTOR, MULTI		*1-627-687-11	Z BOARD	*****	
TB33	*1-561-337-00	CONNECTOR, MULTI		<DIODE>			
TB34	*1-561-337-00	CONNECTOR, MULTI		D1	8-719-812-43	DIODE TLG124A	
TB35	*1-561-337-00	CONNECTOR, MULTI		*****			
TB36	*1-561-337-00	CONNECTOR, MULTI		*1-627-687-11	Z BOARD	*****	
TB37	*1-561-337-00	CONNECTOR, MULTI		<DIODE>			
TB38	*1-561-337-00	CONNECTOR, MULTI		D1	8-719-812-43	DIODE TLG124A	
TB39	*1-561-337-00	CONNECTOR, MULTI		*****			
TB40	*1-561-337-00	CONNECTOR, MULTI		*1-627-687-11	Z BOARD	*****	
*****				<DIODE>			
*1-627-677-11	V BOARD	*****		D1	8-719-812-43	DIODE TLG124A	
1-563-265-11	CONNECTOR, MULTIPLE 10P			*****			
<COMPOSITION CIRCUIT BLOCK>				*1-627-687-11	Z BOARD	*****	
CP1	1-232-350-11	COMPOSITION CIRCUIT BLOCK		<DIODE>			
<RESISTOR>				D1	8-719-812-43	DIODE TLG124A	
R1	1-249-405-11	CARBON	100 5% 1/4W	*****			
R2	1-249-405-11	CARBON	100 5% 1/4W	*1-627-687-11	Z BOARD	*****	
R3	1-249-405-11	CARBON	100 5% 1/4W	<DIODE>			
R4	1-249-405-11	CARBON	100 5% 1/4W	D1	8-719-812-43	DIODE TLG124A	
R5	1-249-405-11	CARBON	100 5% 1/4W	*****			
R6	1-249-405-11	CARBON	100 5% 1/4W	*1-627-687-11	Z BOARD	*****	
R7	1-249-405-11	CARBON	100 5% 1/4W	<DIODE>			
*****				D1	8-719-812-43	DIODE TLG124A	
*****				*****			



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REF.NO.	PART NO.	DESCRIPTION	REMARK
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ACCESSORIES & PACKING MATERIALS  
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PART NO.	DESCRIPTION	REMARK
$\Delta$ 1-532-203-11	FUSE, TIME-LAG (2.0A/250V) (BVM-1416P ONLY)	
$\Delta$ 1-532-746-11	FUSE, GLASS TUBE (4.0A/125V) (BVM-1416P ONLY)	
$\Delta$ 1-551-812-11	CORD, POWER (7.0A/125V) (BVM-1316 ONLY)	
1-560-776-00	SOCKET, CONNECTOR IOP (BVM-1416P ONLY)	
$\Delta$ 1-590-151-11	CORD SET, POWER (10.0A/250V) (BVM-1416P ONLY)	
2-990-242-01	HOLDER (B), PLUG (BVM-1316 ONLY)	
*3-170-078-01	HOLDER (B), PLUG (BVM-1416P ONLY)	
*4-040-311-01	INDIVIDUAL CARTON	
4-040-437-01	MANUAL, O & M	
4-312-246-00	BAG, PROTECTION	
4-378-901-01	KEY	
*4-379-479-01	CUSHION (UPPER)	
*4-379-480-01	CUSHION (LOWER)	
4-391-208-01	LABEL, TALLY NUMBER	